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ABSTRACT

The monograph is one of the Fogarty International Center Series on the Teaching of Preventive Medicine, undertaken to: (1) review and evaluate the state of the art of prevention and control of human diseases; (2) identify deficiences in knowledge requiring further research (including analysis of financial resources, preventive techniques, and manpower); and (3) recognize problems in applications of preventive methods and suggest corrective action. In it is described the interdependent relationships between schools of public health and departments of preventive and community medicine, two organizations that can productively collaborate in promoting the health of individuals and the community they live in. Also included are discussions of: the content and objectives of undergraduate training; orienting the medical student toward disease prevention and health maintenance; methods of teaching and concepts of epidemiology and demography needed to understand the disease patterns in population groups; and resources in the medical school and the community that can be used in teaching preventive medicine. The monograph is addressed to students and teachers and intended for use as a reference source. (Author/MSE)

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ACADEMIC RELATIONSHIPS AND TEACHING RESOURCES

Fogarty International Center Series on the
TEACHING OF PREVENTIVE MEDICINE

Volume 6

ACADEMIC RELATIONSHIPS AND TEACHING RESOURCES

A Report of Conferences Sponsored by the
John E. Fogarty International Center
for Advanced Study in the Health Sciences
and the
Association of Teachers of Preventive Medicine
and the
Association of Schools of Public Health

National Institutes of Health
Bethesda, Maryland

DUNCAN W. CLARK, M.D.
Editor

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
National Institutes of Health

This monograph is the sixth in a series on the
TEACHING OF PREVENTIVE MEDICINE

sponsored by the

JOHN E. FOGARTY INTERNATIONAL CENTER FOR
ADVANCED STUDY IN THE HEALTH SCIENCES

and the

ASSOCIATION OF TEACHERS OF PREVENTIVE MEDICINE

and the

ASSOCIATION OF SCHOOLS OF PUBLIC HEALTH

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This monograph on Academic Relationships and Teaching Resources is one of the Fogarty International Center Series on the Teaching of Preventive Medicine. In it is described the interdependent relationships between schools of public health and departments of preventive/community medicine, two organizations which can productively collaborate in promoting the health of individuals and the community they live in. Also included are discussions of the content and objectives of undergraduate and graduate training; orienting the medical student toward disease prevention and health maintenance; methods of teaching the concepts of epidemiology and demography needed to understand the disease patterns in population groups; and resources in the medical school and the community that can be utilized in teaching preventive medicine. It is hoped that this monograph will be used by students and teachers as a reference source for departments of community and preventive medicine and for schools of public health and will stimulate the collaboration between these two institutions.

MILO D. LEAVITT, M.D.
Director
Fogarty International Center

PREFACE

The Fogarty International Center was established in 1968 as a memorial to the late Congressman John E. Fogarty from Rhode Island. It had been Mr. Fogarty's desire to create within the National Institutes of Health a center for research in biology and medicine dedicated to international cooperation and collaboration in the interest of the health of mankind.

The Fogarty International Center is a unique resource within the Federal establishment, providing a base for expansion of America's health research and health care to lands abroad and for bringing the talents and resources of other nations to bear upon the many and varied health problems of the United States.

As an institution for advanced study, the Fogarty International Center has embraced the major themes of medical education, environmental health, societal factors influencing health and disease, geographic health problems, international health research and education, and preventive medicine. Our commitment to the study of preventive aspects of human disease is expressed in the forthcoming Fogarty International Center Series on Preventive Medicine.

Improvement in the health status of the American people will depend, in great measure, on the design and application of programs which place major emphasis on the preventive aspects of human disease. Although health authorities generally agree with this thesis, there is need for more precise definition of effective methods and programs of prevention, financial resources required to implement these programs, and priorities to be assigned to research in preventive methodology. The need to assemble expertise in this field to elucidate mechanisms whereby the full impact of preventive medicine may be brought to bear on the solution of America's major health problems has been expressed repeatedly in public statement by leaders throughout the health field.

In response to this need, the Fogarty International Center initiated a series of comprehensive studies of preventive medicine in order to review and evaluate the state of the art of prevention and control of human diseases, to identify deficiencies in knowledge requiring further research, including analysis of financial resources, preventive techniques, and manpower, and to recognize problems in application of preventive methods and suggest corrective action.

In an effort to contribute to the educational aspects of preventive medicine, the Fogarty International Center has undertaken a cooperative program with the Association of Teachers of Preventive Medicine to create resource material to assist in the administration, teaching, research, and service responsibilities among departments of preventive medicine, to enhance collaborative activities between departments of preventive medicine and other academic units of health science schools, and to propose national programs of teaching, research, and service in preventive medicine. Topics to be given major emphasis include the role of behavioral sciences in preventive medicine, academic relationships between departments of preventive medicine and schools of public health, international and extramural teaching and research opportunities in preventive medicine, teaching resources of departments, health education, primary care and family medicine, the role of ancillary health personnel in the health care delivery systems, and consumer participation in health care delivery.

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A NOTE FROM THE EDITOR

This volume contains conference reports on three related themes of considerable concern to medical school departments of preventive medicine.

A consideration of Academic Relationships of Departments of Preventive Medicine and Schools of Public Health took place at a conference held at the Fogarty International Center, National Institutes of Health, under the chairmanship of Dr. Warren Winkelstein on March 8–10, 1973. This in fact was scheduled as the first in a series of conferences destined for cosponsorship in the mid-seventies by the Association of Teachers of Preventive Medicine and the Fogarty International Center. Selection of this theme for the first conference is itself tacit acknowledgment of the importance in which teachers of preventive medicine hold their relationship to schools of public health. An association between the two goes back many years; in fact, the first large national conference of professors of preventive medicine ever convened in this country was held at Ann Arbor, Michigan, in 1946 when the University of Michigan School of Public Health served as host. At subsequent national conferences on preventive medicine, the 1963 Saratoga Springs Conference in particular, spokesmen from schools of public health made important contributions to what is seen on both sides as work in a common cause. However, the 1973 Fogarty Conference was the first assembly primarily convened to focus alone on relationships between the two kinds of institutions. As a consequence, the Association of Schools of Public Health agreed to serve as cosponsor of this conference as well.

The second theme, the Teaching Resources of Departments of Preventive Medicine, was the object of conference discussion on August 15–17, 1973 at the Fogarty International Center with Dr. Peter B. Peacock serving as chairman. A fair part of this conference was given over to consideration of extension of the original terms of reference that had been chosen by the program committee, and this led to the step of commissioning additional papers after the conference. In effect, about half of the papers here presented were invited after the conference.

The third theme, Residency Training in Preventive Medicine, was the subject of a conference at the Asilomar Conference Grounds, California, on February 12–13, 1972. This meeting was held solely under the sponsorship of the Association of Schools of Public Health. The views and findings contained in this report describe the first 10 years experience with general preventive medicine residencies in the United States, and, in the view of conference chairman Dr. Joseph Stokes III and keynote speaker Dr. Kurt W. Deuschle, the picture then visible was still valid well into 1975.

It can be argued that these three conference themes are part and parcel of a single larger theme and this, too, justifies their juxtaposition in the one report. It seems no strain of editorial license to advance this view even though convenience of publication as a single volume has been of equal consideration. In brief, the teaching resources of preventive medicine draw strength from the ideas and activities of schools of public health as well as from the world of the medical school. The continued evolution of residency training in general preventive medicine in medical schools and schools of public health is clearly essential for the development of new generations of teachers and investigators. The schools of public health depend in considerable part for medical recruitment on the interest in the subject first established by exposure to preventive medicine in a medical school. Finally, there is a movement of faculty as well as students in both directions between departments of preventive medicine and schools of public health.

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PART I

ACADEMIC RELATIONSHIPS BETWEEN MEDICAL SCHOOL DEPARTMENTS OF PREVENTIVE MEDICINE AND SCHOOLS OF PUBLIC HEALTH

Chairman: *Dr. Warren Winkelstein*

INTRODUCTION

In planning a series of workshops to be sponsored jointly by the Association of Teachers of Preventive Medicine and the Fogarty International Center in the general field of preventive medicine, it became evident that many of the concerns and responsibilities of medical school departments of preventive medicine were shared by schools of public health.

Each has special commitments and opportunities and yet there is much in common: the teaching of common themes, service to the same public, and research on many of the same community health problems. A workshop on relationships between these two types of educational institutions, it was decided, should take place under the aegis of the Fogarty International Center. As a center devoted to the international aspects of health, preventive medicine is of great concern, and the Fogarty Center is committed to its advance and application.

This review took place at a time when the future of federal funding and support of teaching and research programs in public health were less than clear. About 35 participants gathered at the Fogarty International Center, National Institutes of Health, on March 8–10, 1973, and this report contains highlights from that meeting.

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1

EVOLUTION OF PUBLIC HEALTH AND PREVENTIVE MEDICINE IN THE UNITED STATES

Milton Terris

In the *Public Health Reports and Papers* (*1*) presented at the first Annual Meeting of the American Public Health Association in 1873, the Secretary of the Association began his introductory note as follows:

> *On the 18th of April, 1872, an informal conference of a number of gentlemen who for several years had been in some degree co-workers in the studies of Preventive Medicine and in duties of public sanitary service, was held in the city of New York, with the design to secure concerted effort, and establish some adequate plans in the cultivation of hygienic knowledge, and procuring more effective applications of sanitary principles and laws. The committee which was appointed at that conference submitted a plan of organization at a subsequent meeting, held on the 12th and 13th of September, 1872.*

The failure to make any distinction between public health and preventive medicine at the birth of the American Public Health Association is worth noting, as is the emphasis on both the cultivation of hygienic knowledge and its practical application. Of interest also is the fact that all officers and members of the Executive Committee elected on September 13, 1872, and again on November 13, 1873, were physicians.

The first President of the association, Stephen Smith, M.D., opened the annual meeting in 1873 with an address *On the Limitations and Modifying Conditions of Human Longevity, the Basis of Sanitary World*, which began with the statement: "We inaugurate to-day the American Public Health Association, the objects of which are 'The advancement of sanitary science, and the promotion of organizations and measures for the practical application of public hygiene.' " He declares his judgment of the great potentialities of public health and preventive medicine—a judgment that was to be overwhelmingly confirmed in his own lifetime—by stating that "the science which we cultivate, and which this Association is organized to promote, discarding the traditions of the past and the teachings of false philosophies, interprets the laws that have been set for the guidance and control of man's earthly existence by the exact demonstrations of a true physiology. This science of life reveals to us the stupendous fact that man is born to health and longevity, that disease is abnormal, that death, except from old age, is accidental, and that both are preventable by human agencies."

Smith asked the question: "How may sanitary knowledge be made available and be applied with the greatest effect?" and discussed the more important methods which included: (1) the education of the people; (2) the thorough education of the medical profession in sanitary science, and the reduction of that science to daily practice; (3) the professions of architecture, engineering, and allied departments of business must be educated in sanitary science; (4) the state must perform an important part in the application of sanitary knowledge; and (5) finally, the general government should, within its appropriate sphere, cooperate with state governments.

It is interesting to note that Smith began his discussion of item 1, the education of the people, with the statement that, "The general facts of physiology and pathology, the basis of all preventive medicine, should be taught in all our schools." Even more interesting—and disturbingly modern—was his discussion of item 2, which is here reproduced in full:

> *The medical profession is the proper conservator of the health of the people. Its members are devoted as a life's work to the study of the nature, causes, and remedies of diseases. Whatever advance has been made in our knowledge of diseases, either in its prevention or cure, has been made by this profession. And although medical men have always been sanitary reformers, yet the customs of society have sadly misplaced their duties. In practice, the physician is called to cure disease, and to this feature of his every-day duties he devotes all his thoughts. He waits until the cause has begun to operate before he begins to apply his knowledge. His efforts are now di-*

rected, first, to save life; and second, to prevent damage to the system. Great as has been the advance in our knowledge of therapeutics, it is but fair to say that in both efforts he is very liable to fail. One fact in nearly every case of sickness known is always apparent to the physician, and that is, that at one period the disease might have been prevented, and he recognizes how infinitely more important his advice was at that time. Then disease could have been prevented. Now it cannot perhaps even be controlled. The conclusion seems inevitable, in whatever light we may view the subject, that the physician's duties are sadly misplaced. He should have such relations to the families which he attends that his advice is constantly sought in methods of prevention, as well as in methods of cure. If this were the case, and the medical profession was as much devoted to the practice of the art of preventing as it is in curing disease, there can be no doubt that many diseases which now decimate communities would disappear altogether, and the larger number would have the mortality set opposite them greatly reduced. Thus our normal longevity could again be largely extended. In order to (attain) this important reform the medical schools must incorporate Sanitary Science in their course of study, and confer degrees for proficiency in these studies, while the custom of society must be so changed that the physician is employed to prevent rather than to cure disease.

CHANGES IN CONTENT

The concerns of public health and preventive medicine in 1873 are indicated by a partial listing of the subjects discussed at this first annual meeting of the American Public Health Association. They included public instruction in sanitary science; principles of hospital hygiene; the relations of architecture and hygiene; heat as an element in sanitary climatology; the relation of city and country life to health and longevity; epidemics of cholera and yellow fever; vaccination against smallpox; principles and practices of quarantine; sanitary care of refuse; disinfection; water supply of cities; state and local sanitary organization; the necessity for a national sanitary bureau; and the need for a uniform system of registration of causes of death throughout the United States. Prophetically, the volume contains Austin Flint's description of a water-borne outbreak of typhoid fever in North Boston, New York, as well as a paper by the President of Columbia College, F. A. P. Bernard, LL.D., on *The Germ Theory of Disease and its Relations to Disease*, which concludes that "neither the germ theory of contagious disease, nor the chemical theory, is exclusively true."

In 1897, at the 25th Annual Meeting, the association boasted 568 members, of whom 452 or 80 percent were physicians (*2*). In his presidential address, Dr. Henry B. Horlbeck of Charleston, South Carolina, noted that "Bacteriology is not a part and parcel of our science. It is one of the foundation stones of all progress in the opening of our knowledge of sanitary science." Referring to the work of Jenner on smallpox, Pasteur on rabies, and Behring on diphtheria and tetanus, he declared that "protective inoculation has been established and recognized for our daily use and benefit; conferring a vast boon that is simply incalculable, already bearing the most abundant fruit, and destined, it is hoped, to increase and multiply its usefulness and donations to mankind. It is a discovery opening up a land of promise of almost unlimited territory, in which the enlightened practitioner can combat and conquer the most fatal diseases that assail the human race. As the principles of natural and acquired immunity have been studied, and the observations of Pasteur, Koch, Sternberg, and others appreciated and noted and understood, there has been a mighty impetus given in this direction."

The papers presented at this annual meeting covered a wide range of problems of infectious disease control, including: disinfection and fumigation; water purification; refuse disposal; isolation; the diagnosis of typhoid fever by Widal's blood reaction; studies in the etiology and prevention of typhoid fever, diphtheria, tuberculosis, and yellow fever; and the need for uniform and cooperative health laws.

The sesquicentennial meeting of the association, held in 1921, registered approximately a tenfold increase in membership, there being about 5,000 members (*3*). In addition to the papers on infectious diseases, there were some dealing with industrial hygiene, others with health education, and a fairly large number concerned with maternal and child health—including such subjects as maternal mortality, the midwifery problem, prevention of rickets, undernourished school children, the hygiene of cardiac children, and school health supervision (*4*).

The 75th Annual Meeting in 1947 marked some expansion in the scope of public health concern. Fluoridation and other aspects of dental health, nutrition, health education, and industrial hygiene problems were discussed. Curiously, there were no reports at all on chronic disease epidemiology, while medical care was represented by a single paper by Surgeon-General Thomas Parran on *New Problems in the Field of Medical Care*, and a single session on hospital relations (*5*).

Compare this to the bewildering array of subjects presented at the centennial meeting of the American Public Health Association in 1972 (*6*). The epidemiological sessions were concerned, in the infectious disease area, with rubella, diphtheria, measles, hepatitis, venereal disease, tuberculosis, diarrheal disease, acute lower respiratory disease in children, nosocomial infections, food-borne diseases, and serological epidemiology. Other subjects included: cancer of the cervix; occupational lung cancer; cancer of the mouth and pharynx; childhood leukemia; coronary heart disease; diabetes mellitus; hypertension; stroke; byssinosis; asthma; psoriasis; risks from radiation and air pollution; obesity; drug abuse; pregnancy outcomes, prematurity, and fetal, infant, and maternal mortality; results of nutrition surveys; and screening for childhood lead poisoning. The epidemiology of violence received considerable attention, including homicide, suicide, childhood injuries, burn injuries, and motorcycle and automobile accidents. The effects of specific control programs on health status were reported, including the impact of liberalized abortion laws on pregnancy-associated deaths, the evaluation of health care in terms of outcomes, and the results of methadone maintenance programs for drug addicts. The use of multiphasic screening to evaluate health status was also presented.

Even more striking, perhaps, was the scope of subjects included in the presentation and discussion of health services. Environmental control issues comprised: radiation protection; housing; food protection; water resources and quality; waste treatment technology; occupational health and safety; swimming pool codes; air pollution; environmental manpower; planning and standards; nonionizing radiation; the environment of long-term health care facilities; and a national health policy for the environment. Specific disease control programs included: venereal disease; tuberculosis; rabies; brucellosis; dental disease; lead poisoning; drug abuse; sickle cell disease; blindness; reading disability; injury; alcohol-related auto accidents; coronary heart disease; children's emotional disorders; malnutrition; and coal workers' pneumoconiosis. Public health administration issues concerned: local health department services as well as international health programs; regionalization of laboratory services; health program evaluation; health education for migrant populations; training and testing of personnel; screening programs for chronic disease detection; comprehensive health planning; and a national policy for health education. In the field of maternal and child health there was discussion of child development services, contraception and pregnancy in adolescents, school health, nutritional high risk prenatal patients, hearing screening programs, learning disabilities, abortion and sterilization, family planning services, and the relation of population policy to health policy.

Finally, personal health services included a wide range from mental health services and dental care to ambulatory care and emergency services, with discussion of health maintenance organizations, the role and training of health workers in different countries, experience with physicians' assistants and family nurse practitioners, evaluation and control of quality of care, utilization of services, prepaid group practice, health services for older people, neighborhood and rural health centers, social services, nursing homes, pharmaceutical services, care in correctional institutions, health problems and care in the black community, the right to treatment, national health programs in other countries, the struggle over national health insurance, and a national health policy for personal health services.

The development of sections of the American Public Health Association provides another measure of the growth in the scope of public health, on the one hand, and of specialization within public health, on the other. The Laboratory Section was the first to be established, at the turn of the century; now there are 19 sections, covering a wide variety of disciplines and content areas (Table 1). Perhaps the most crucial decision regarding a new section was made in 1948, when the Medical Care Section was established despite the determined opposition of the

TABLE 1. Year of Organization of Current Sections of the American Public Health Association

Year	Section	Year	Section	Year	Section
1873		1907		1940	
74				41	
75		08	Health Administration Statistics	42	School Health
76					
77		09		43	Dental Health
78		10			
79		11	Environment	44	
80		12		45	
81		13		46	
82		14	Occupational Health	47	
83				48	Medical Care
84		15			
85		16		49	
86		17	Food and Nutrition	50	
87				51	
88		18		52	
89		19		53	
90		20		54	
91		21	Maternal and Child Health	55	Mental Health
92					
93		22	Public Health Education	56	
94				57	
95		23	Public Health Nursing	58	
96				59	
97		24		60	
98		25		61	
99	Laboratory	26		62	
1900		27		63	
01		28		64	Radiological Health
02		29	Epidemiology		
03		30		65	
04		31		66	
05		32		67	
06		33		68	
		34		69	Community Health Planning
		35			
		36			
		37			
		38			
		39		70	Social Work Veterinary Public Health
				71	New Professional
				72	

Health Officers Section and of others who wished to keep public health within the confines of preventive medicine. The ideological and organizational background of this conflict has been well documented by Viseltear (*7*), but it may be helpful to chart some of the conceptual changes regarding the scope and functions of public health which emerged in this period.

CONCEPTUAL CHANGES

In 1944, the American Public Health Association adopted an official statement on *Medical Care in a National Health Program* (*8*) which stated that "A national program for medical care should make available to the entire population all essential preventive, diagnostic, and curative services," and, "should be adequately and securely financed through social insurance supplemented by general taxation, or by general taxation alone." It also recommended that "A single responsible agency is a fundamental requisite to effective administration at all levels—federal, state and local. The public health agencies—federal, state and local—should carry major responsibilities in administering the health services of the future."

In 1948, in a joint statement of the American Public Health Association and the American Hospital Association on *Coordination of Hospitals and Health Departments* (*9*), the point was made that "Preventive and curative medicine have reached the state where they are no longer separable, and it is necessary at the present time to bring them together physically and functionally."

These statements were clearly at variance with the policy adopted by the association in 1940 which outlined the "desirable minimum functions" of local health departments in a restricted fashion. The "basic six" functions included vital statistics, sanitation, communicable disease control, laboratory services, maternal and child health, and health education (*10*). Ten years later, in 1950, the functions of the local health department—"the basic service unit in the administration of public health"—were drastically redefined. In an official statement on *The Local Health Department—Services and Responsibilities* (*11*), the American Public Health Association noted that "The concept of the services of the local health department has undergone considerable change. As a result of advancing medical knowledge and public health practice, there has been a sharp decrease in morbidity and mortality from infectious diseases, particularly in infancy, childhood, and the early adult years of life. Because of the marked changes in the age distribution of the population and in the spectrum of our health problems, the theory and practice of public health has expanded to include not only prevention of the onset of illness but also prevention of the progress of disease, of associated complications, and of disability and death." The statement also noted that "Definitions of local health services and responsibilities based on limited categories of activity have become quickly outdated as a result of this rapid development of health administration. It is essential, therefore, to define the optimal responsibilities of the local health department, to list the general types of service provided, and to indicate the specific methods utilized in the solution of local public health problems." These were then categorized as: (1) Recording and Analysis of Health Data, (2) Health Education and Information, (3) Supervision and Regulation, (4) Provision of Direct Environmental Health Services, (5) Administration of Personal Health Services, (6) Operation of Health Facilities, and (7) Coordination of Activities and Resources.

It was this marked change in the conceptualization of public health that made it possible to establish the Medical Care Section in the American Public Health Association. From a concern limited to infectious diseases, public health workers had moved toward viewing all causes of ill health as their responsibility. From a limited preoccupation with preventive medicine and preventive health services, they became interested in the organization of all types of health services. In 1955, 7 years after the bitter struggle over the Medical Care Section, the organizers of the campaign for creation of a Mental Health Section were surprised, pleased, and a little disappointed that there was not the slightest opposition to their request. The battle had been won in 1948; the restrictions on the scope of public health had been decisively and irrevocably broken.

CHANGES IN PUBLIC HEALTH PERSONNEL

With the establishment of new sections and the influx of new types and categories of health workers, the membership of the American Public Health Association grew from about 5,000 in 1921 (*3*) to almost 13,000 members in 1952 (*12*). It remained at about 13,000 until 1961, when a period of unusually rapid growth occurred. Within a short period of 7 years, the membership increased to 22,000. Pace setter in this growth was the Medical Care Section, which increased from less than 1,300 members in 1961 to over 3,100 members in 1968. Whereas in 1961 the Health Officers had been the largest section in the association, by 1966 the Medical Care Section had taken first place in number of members.

Concomitant with the growth of the association, there occurred a considerable decline in the preponderance of physicians, who had accounted for 80 percent of the 568 members in 1897. In 1968, physicians were still the largest professional group in the association, but they now comprised only 29 percent of the membership. Holders of Ph.D. and Doctor of Science degrees accounted for 9 percent, Registered Nurses 6 percent, dentists 3 percent, and Doctors of Veterinary Medicine 2 percent. Sixteen percent of the members had master's degrees, mainly in arts or sciences, but some were in more specialized fields such as nursing, education, social work, hospital administration, and sanitary engineering. A variety of other nonpublic health degrees were represented, each in small numbers, while 20 percent of the members had no such degrees. It is worth noting, furthermore, that 26 percent of the members held a public health degree, and in 83 percent of these it was the Master of Public Health.

The great increase of nonphysicians among public health personnel reflected a general phenomenon in the health field. In 1900, physicians accounted for 63 percent of all professionally trained health workers; by 1960, they were only 21 percent of the total (*13*). But the growth in numbers of public health workers and the scope of their functions also reflected profound changes in popular attitudes and understanding. It became recognized increasingly that the health of the public was a matter of public health, that organized community action was necessary not only to prevent disease and violence but to mitigate their effects in causing ill health, disability, and death, and that the issues were too important to be left to chance or to the practicing physicians.

REACTION OF THE MEDICAL PROFESSION

The practicing physicians, it should be noted, were for the most part hostile or indifferent to the growth and expansion of public health. It is true that at its first session in 1847, the American Medical Association (AMA) chartered a policy in favor of adequate vital statistics legislation in the United States, and that prior to World War I it also campaigned for a national health department and for federal legislation on food and drugs (*14*). These were restricted concerns, however, and were superseded by a more general concern that the growth of governmental action in the field of public health might be competitive with the physician and make inroads on his income. This has been clearly evident at the local level, where physicians to this day have resisted health department immunization programs because they might lose fees as a result, and where medical societies have succeeded in many communities in forcing the health department to confine its services to the needy in order that there be no infringement on the market for physicians' services.

At the national level, the American Medical Association campaigned actively against the Sheppard-Towner Act of 1921, which provided federal subsidies to the states for maternal and infant welfare programs. In 1930, the House of Delegates of the AMA condemned the act as "unsound in policy, wasteful and extravagant, unproductive of results and tending to promote communism. . . ." (*14*). This attitude on the part of physicians and their organizations has persisted ever since, and has become more pronounced as the scope of public health has continued to widen.

A few examples may help to give concrete foundations to this general statement. In 1897, acting on a recommendation by Dr. Hermann M. Biggs, the New York City Board of Health made tuberculosis a notifiable disease. The medical profession condemned the action; not only the New York County and Kings County medical societies but even the New York Academy of Medicine officially opposed it. The *Medical Record* reacted with an editorial which stated that "The real obnoxiousness of this amendment to the sanitary code is its offensively dictatorial and defiantly compulsory character. . . . The profession as a whole has watched with jealous eye the encroachments of the Board upon many of the previously well-recognized privileges of the medical attendant . . ." In a later editorial, the objections were made more explicit, stating that "there is no objection to the reports of pulmonary cases for statistical purposes." It goes on to say that "It is, however, the extra missionary work assumed by the board which is the ominous and threatening quantity in the equation—the desire to assume official control of the cases after they have been reported, thus not only, by means of alarming bacteriological edicts, directly interfering with the physician in the diagnosis and treatment of the patient, but in the end, by the creation of a public suspicion of his ignorance, possibly depriving him of one of the means of a legitimate livelihood." The editorial further states that "The only basis of a proper understanding in this matter is the guarantee of the board that in case the returns of pulmonary cases are faithfully made, for statistical purposes only, there shall be on its part no direct or indirect interference between patient and physician, either in the way of official inspections, bacteriological diagnosis, forced isolation, suggestions for treatment, or presumptuous instructions to the patient regarding hygienic precaution. If we mistake not, the profession is very much in earnest in thus dividing responsibility with the board and will yet be able to vindicate its rights and demonstrate its power." (*15*). Its power, however, proved to be insufficient.

Again in 1912, when the New York City Health Department under Biggs' leadership made venereal diseases reportable, the opposition was so strong that he stated: "The ten year long opposition to the reporting of tuberculosis will doubtless appear as a mild breeze compared with the storm of protest against the sanitary surveillance of venereal diseases." (*15*). The protests again failed to stop the program.

In 1920, however, while Biggs was New York State Commissioner of Health, the medical societies did succeed in defeating a proposal which could have greatly expanded the scope of public health. This was Biggs' Health Center Bill, which provided for state aid to local communities to create health centers which could include hospitals, outpatient clinics, "including especially those now regarded as public health clinics," laboratories, public health nursing, school health services, periodic medical examination for individuals desiring it, and headquarters for all public health, medical, nursing and other public welfare agencies wishing to utilize the center. The bill was defeated, both in 1920 and 1921, primarily because of the hostility of the medical profession (*15, 16*).

At a symposium on the health center legislation sponsored by the New York County Medical Society, the objections of the medical profession were summarized by the Secretary of the State Medical Society. Of the five speakers, only Biggs spoke in the affirmative. He presented the arguments for the bill, and then went on to say:

But I do want to emphasize one or two things strongly. That is, that the medical profession has been very unfortunate, I think, in the general attitude which it has taken. Perhaps you do not remember it, but I remember seven years ago speaking at a meeting in this hall, when you were discussing the supervision of venereal diseases, in which three of four papers were read attacking the action of the City Board of Health with reference to the supervision of the venereal diseases. I remember at that same time committees were appointed by the Medical Boards of the City Hospital, the Metropolitan Hospital and the Kings County Hospital, and these three committees forming a joint committee went to the Mayor and asked him to intervene and to compel the Health Board to rescind its action looking toward the supervision of venereal diseases. And all that the Health Board required then, or asked then, was that cases of venereal disease under treatment in general hospitals and in dispensaries should be reported to the Health Department, it providing laboratory facilities for the diagnosis of venereal diseases.

Nothing could have been sharper than the criticism at that time on the action of the Board of Health, or more general than the demand of the medical profession for the rescinding of that action. That was exactly what happened with regard to tuberculosis years ago, and I spent a good part of the winters of 1898 and 1899, and part of 1900 in Albany, trying to prevent the enactment of legislation which was initiated by the New York County Medical Society for withdrawing the power from the New York City Board of Health to deal with tuberculosis at all. . . .

Now the general attitude of the medical profession is part of the kind of work that they do; the fact that a physician is generally so absorbed in what he is doing, his own work and the work with his own patients, that he does not look out and get a broad view of the situation as it exists in the state, and his attitude, the natural attitude, is one of obstruction. Now, I do not venture to maintain, nor would I for one moment argue, that the health center legislation which was introduced last year is model legislation. It was the best that we were able to devise at that time. The need for it exists. Now, no action which this Society, the Academy of Medicine, or the profession of medicine in this state may take—no action of a negative kind is going to change that situation, and if we do not change it somebody else will take action to meet this condition. . . .

Now if your Comitia Minora, or some special committee, will study the situation and offer constructive legislation or constructive criticism, that is what we want. But you may be quite sure that the attitude of simple opposition will not much longer be effective." (16).

THE ORGANIZATIONAL FRAMEWORK

If one examines the scope of programs and problems discussed at the 1873, 1897, 1921, and 1947 meetings of the American Public Health Association, it is evident that the broadening scope of public health took place within the established framework of federal, state, and local health departments and their allied voluntary agencies. In 1921, for example, the new areas of discussion were maternal and child health, health education, and industrial hygiene. These reflected developments within the official health agencies. The first Division of Child Hygiene had been established in the New York City Health Department in 1908, the federal Children's Bureau was created in 1912 (the famous pamphlet, *Prenatal Care,* first appeared in 1913), and federal aid to the states for maternal and infant welfare began in 1921. The first bureau for health education was organized by the New York City Health Department in 1914, and the New York State Health Department followed suit in the same year. A Division of Industrial Hygiene and Safety was established by the U.S. Public Health Service in 1914, the year that a Section on Industrial Hygiene was established by the American Public Health Association (*17*).

Contrast this with the 1972 annual meeting, where it was abundantly clear that the content of the sessions went far beyond the programs and problems of health departments. This is particularly true of medical care and of the environment. Not even the federal health services can be said to encompass these areas, since Medicare and Medicaid are the responsibility of other administrative units, and environmental programs are the concern of a special agency.

These discrepancies between traditional organizational forms and the burgeoning content of public health have been perceptively described in a recent editorial by Dr. George Rosen, editor of the *American Journal of Public Health*. He writes that:

> *It is clear that the continuing specialization of public health is one of the important factors underlying the malaise and disarray which marks it. The centrifugal tendencies inherent in specialization could be effectively controlled as long as the goals of public health were clearly envisaged within an accepted program, and an institutional form was available to encompass the diversity of knowledge and professional identity which emerged with the expansion of public health in the earlier decades of this century. Essentially, this involved the control of bacterial pollution in the environment, the prevention of communicable diseases and conditions produced by defective nutrition, and the achievement of these aims through an official health agency, a local or a state health department, complemented in various ways by voluntary health agencies.*
>
> *The achievement of these aims to a considerable extent, the emergence of newer health problems, and the consequent change in the scope and focus of public health disrupted the previously existing situation, and left the various groups of public health workers without a generally accepted integrated program or an institutional structure through which it might be put into practice. In this situation centrifugal tendencies of special groups have led to a multiplication of agencies concerned with health problems. Fragmentation which appeared earlier in clinical medicine as a consequence of specialization is now fully apparent in public health. Recognition of this problem has not been lacking, but so far efforts to deal with it have not achieved much success. Health service administration has emerged as a concept, but more than a concept is needed.* (*18*).

Rapprochement between the present content of public health and its organizational framework is fully possible only with the establishment of a national health service. For a nation which has not yet attained national health insurance, however, the former is hardly an immediate possibility. If the precedents set by Medicare are followed in the organization of national health insurance, there will be little hope of achieving an adequate structure. Instead, we shall be subjected to a financial, as opposed to a health service, program; to the administrative separation of medical care from preventive services; to the exclusion of immunization and other preventive procedures from health insurance coverage; to the continued dominance of fee for service remuneration; to the use of deductibles and coinsurance; and to the legal prohibition of changes in the health care delivery system. It will require maximal public health leadership to prevent these outcomes. Perhaps the traditional friendly ties of the United States with Great Britain and with Canada will be helpful, for if we are willing to learn from the experience of the National Health Service in Great Britain and National Health Insurance in Canada, we may yet be able to avoid following the path taken by most Western European health insurance programs.

The present imbalance between the content of public health and its organizational structure will eventually be rectified. In the interim, however, there are only two institutions that can bring together all of the diverse fields and programs of public health into a working unit. For this reason, they have a crucial significance in this difficult period and should be treasured and supported unstintingly. I refer to the American Public Health Association and the schools of public health.

THE SCHOOLS OF PUBLIC HEALTH

Just as the American Public Health Association has grown in terms of membership, sections, and scope of program, so the schools of public health have expanded in number, the size of student body and of faculty, the variety of types of students, and the breadth and depth of their teaching and research programs.

Unlike health departments, which could not expand their scope beyond that which legislative bodies would permit, the universities have been relatively free to act. Today, all of the schools base their programs on a broad concept of public health, although they vary considerably in their ability to realize that concept.

The reorientation of public health and preventive medicine has placed important responsibilities on the schools. They have the task, on the one hand, of developing further the scientific basis of public health in new and unfamiliar areas. On the other hand, they need to educate the large numbers of different kinds of public health workers who are now required to organize and administer health services for the public. To be effective in carrying out both functions, the schools need continuing and increasing federal and state financial support. It is essential also that they maintain close linkages with the health departments and other health service agencies in their region in order that they do not stray too far from reality. Finally, they must in every case be an independent school within the university, since administrative subservience to a medical school is seriously restrictive and growth-inhibiting. No school of public health should be eligible for accreditation unless it is genuinely independent.

It is curious that not a single one of our great or even small universities has taken the opposite position, namely, that physicians' services are only part of the total complex of health services, and that the medical school should therefore be administratively responsible to the school of public health. In this situation, the latter would be in a position to develop policies which might encourage the medical school to educate physicians who are genuinely concerned for the health of the public.

DEPARTMENTS OF PREVENTIVE MEDICINE

The departments of preventive medicine in the nation's medical schools have the most difficult task of all. As this review of the evolution of public health and preventive medicine in the United States has indicated, progress has occurred despite the indifference and hostility of most members of the medical profession. Much of the hostility, of course, is a by-product of the fee-for-service method of remuneration; physicians on salary do not need to fear the inroads of the health department. In the medical school, at least for the full-time staff, the economic factor is less important because only part of the faculty members' incomes comes from private practice. However, hostility based on struggles for departmental and personal power is not uncommon, while the indifference is both real and pervasive. Biggs was eminently correct when he stated that "The general attitude of the medical profession is part of the kind of work that they do; the fact that a physician is generally so absorbed in what he is doing, his own work and the work with his own patients, that he does not look out and get a broad view of the situation as it exists in the state, and his attitude, the natural attitude, is one of obstruction," (*16*).

It follows that a major task of departments of preventive medicine is to undertake research and provide effective teaching in epidemiology and health service organization, not only because this is an important part of the scientific and medical background of medical students, but also so that they may "look out and get a broad view of the situation" in which they as physicians will serve the public. Another important task is to bring those students who are strongly motivated toward public service into the field of public health; each new generation needs to be encouraged to bring forth its Stephen Smiths, its Charles Chapins, its Joseph Goldbergers, its Hermann Biggses, and its Joseph Mountins.

The ability to meet these responsibilities cannot be achieved by reliance on budgetary support from the medical schools; the indifference is too great. Yet federal grants were not made available for the teaching of preventive medicine until the middle of the last decade. In my presidential remarks to the Association of Teachers of Preventive Medicine in 1962, I noted the curious paradox that while the Public Health Service was granting federal subsidies to all medical schools for training in a number of special fields, no such provision was made for its own field of public health despite the shortage of medical candidates for public health careers and the woefully inadequate budgets of departments of preventive medicine. It was my judgment then that "What is needed—and needed now—is an adequate preventive medicine training grant for every medical school in the country," (*19*). Today that judgment remains painfully valid.

Any realistic appraisal must recognize that the departments of preventive medicine, even with such aid, will be in no position to muster the resources that are available to the schools of public health. The growth in the number of these schools and the improvement of their geographic coverage make possible the development of regions in which each school of public health can relate effectively, for mutual benefit, to the surrounding departments of preventive medicine. Let us hope that such modest attempts at regionalization will not suffer the fate of their more global predecessors.

Should they be successful, these programs to strengthen departments of preventive medicine will be helpful but not decisive. This was clearly understood by Stephen Smith, who said of physicians in 1873 that "the customs of society have sadly misplaced their duties," and that not only must the medical schools incorporate sanitary science in their course of study but "the custom of society must be so changed that the physician is employed to prevent rather than to cure diseases." (*1*).

It is the custom of society that needs revision. Nothing less than the complete restructuring of social custom in health—including both organizational and conceptual elements—will make it possible to realize the primacy of prevention which Stephen Smith advocated. This is a consummation devoutly to be wished; to gain it will require years of work and change.

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DISCUSSION

Warren Winkelstein, Jr.

Terris has provided us with a stimulating and provocative review of the public health movement in America from the establishment of the American Public Health Association (APHA) by physicians interested primarily in preventive medicine to its present multidisciplinary and multidirectional state. He has shown how the organized component of the movement interacted with organized medicine and how the social components of medical care were incorporated into public health. Finally, he has suggested that achievement of the goal of primacy for prevention will depend upon the basic restructuring of social customs in health, and he has challenged the schools of public health to continue to provide leadership in this area and for departments of preventive medicine to introduce this philosophy into clinical medicine. I should like to add to Terris' recital a few comments on some parallel developments which I believe support his interpretations and conclusions.

The 1830s and 1840s were turbulent decades in Europe with many social reforms suggested and some actually implemented. In England in 1848, Chadwick completed his monumental *Report of the Poor Law Commissioners* which proposed radical measures designed to improve the life of the laboring classes. This report relied heavily on mortality statistics and morbidity testimonials to justify its many recommendations. Chadwick, sometimes called the most unpopular 19th century Englishman, arranged for the printing of 200,000 copies of the report. It was, therefore, highly probable that copies were quickly shipped to New England for distribution through Boston bookstores. One of the most prominent booksellers in old Boston was also the founder of the American Statistical Association and was himself a man of unusual abilities. I refer, of course, to Lemuel Shattuck, whose report for the Massachusetts legislature published in the early 1850s, provides a prescription for a modern health service which is almost comprehensive enough to meet Terris' admonition for a national health service. If one examines the Shattuck report in the light of the previous Chadwick report, even to the title page, one will be amazed at the similarity and struck by the realization of the import which English social reform had on the development of American public health policy. At any rate, I would hypothesize that during the late 19th century, American medicine was far more receptive to social concerns than it would be after the advent of the bacteriological era and the so-called reform of American medical education. Thus, the ideas incorporated in the Shattuck report would have found sympathetic ears among many enlightened physicians, among whom would probably number the founders of the APHA.

However, as bacteriology began to indicate that many diseases had a "single" cause, the ecological approach to disease prevention was deemphasized. Furthermore, after the Flexner report, American medical education placed increasing emphasis on the "science" of medicine and the pragmatic practices of the physicians, which were called "art," and which we now are beginning to recognize as psychosocial understanding, were deemphasized. This led to a further isolation of clinical medicine from social contact and concern. Incidentally, I think the failure to include a social and preventive medicine component in the model medical school was simply a failure to fully read and understand the Flexner Report.

Nevertheless, in the late 1920s, the American Medical Association, in cooperation with other organizations, commissioned the Committee on the Cost of Medical Care (CCMC). The CCMC, under the chairmanship of a very prominent physician, Ray Lyman Wilbur, President of the AMA, completed in 1932 the 18 volumes which provide the prescription for much of what we now view as progressive medical care organization. Of course, the report of the CCMC was anathema to most of organized medicine, but it was the reference point for the unsuccessful efforts to organize a national health service during the Roosevelt and Truman administrations of the 1940s and early 1950.

There seems little doubt that the social legislation of the Roosevelt administration plus the enlightened leadership of people like Thomas Parran and Joseph Mountin spearheaded the reintroduction of social concern into medicine. The fact that organized medicine had to confront the new ideas so often forced it to eventually attempt to understand them. While this is a tremendous oversimplification, I think there is good reason to accept this hypothesis.

However, even if organized medicine accepts the concept of social responsibility for medical care, the recognition of primacy for prevention must follow the realization that the provision of medical care is largely unrelated to the health status of the population. This truism was apparent to Hippocrates, to Frank, to Chadwick, and to Shattuck, but is rejected by most practitioners and the public who have been led to believe they are giving and getting health care when, indeed, they are getting (sometimes) medical care.

And so, we return to a consideration of our joint roles and responsibilities in providing the education and training for those who would concern themselves with the social aspects of health and disease.

2

DEPARTMENTS OF PREVENTIVE MEDICINE IN THE U.S.A.: PAST, PRESENT, AND FUTURE

Robert L. Berg

The development of departments of preventive medicine has been characterized by great variability, mainly of two kinds: between departments and within departments over time. It is a result of forces to which all medical disciplines have been exposed, but the consequence for preventive medicine has been largely a different set of responses experienced by other disciplines and often compensatory to them. It can be seen, as an example, in the results of increased specialization after World War II, aided by the rapid growth in federal funds for research. Most medical disciplines offered less comprehensive care, and some withdrew to laboratories and special study units. This shift created a vacuum in the area of institutional provision of comprehensive health care which then became the responsibility of some departments of preventive medicine when newly created or diverted from other functions.

EXTERNAL FORCES

The major forces or events which have shaped the roles and activities of departments of preventive medicine include the following:

A. Control of Infectious Diseases. As Terris (*1*) has pointed out in this conference, organized public health, as seen through the annual conferences of the American Public Health Association, was predominantly concerned with infectious disease from the latter part of the nineteenth century into the 1930s. Departments of preventive medicine reflected these concerns in their teaching and research activities. There was a need to instruct all physicians in the principles of proper sewage disposal and water supply in the period before these activities were highly institutionalized. A large majority of the population lived without common sewage disposal and there was much concern for the proper relationships of the well and the privy. As the migration from the farm to the city grew, and as institutionalization progressed, it was recognized that only a few of the products of medical schools would be concerned with water supplies and sewage disposal. The growth of schools of public health provided a setting in which those physicians who would have interests and responsibilities in these areas could be trained. Nevertheless, infectious-disease research continued as a major strength and predominant concern in many departments of preventive medicine. Indeed in 1960, infectious-disease research accounted for 38 percent of projects in departments of preventive medicine (*2*).

The success of immunization programs further reduced the impact of infectious disease, and, particularly during the 1920s and 1930s, there was a considerable tendency for immunizations to be viewed as a public health responsibility under the jurisdiction of health departments. In the 1940s the development of antibiotics led to new efforts in disease control.

In addition to continuing concern for infectious disease control, new energies were directed to other areas of community health activities, as pointed out by Terris (*1*), including chronic disease, maternal and child health, mental health, and health care delivery. This was evident in Leavell's (*3*) report in 1941:

> *There have been three developmental stages in teaching preventive medicine to medical students. First, the bacteriologic and sanitary advances of the past 100 years were presented. This was quite often done as a sideline by the professor of bacteriology. Then, as public health advanced, many deans felt their students should be informed of the progress underway. Local, state or federal health officers were called upon to teach, usually on a part-time basis, and at small cost to the medical schools. These health officers and their bureau heads generally presented their subject in more or less technical terms, giving little thought to the fact that few medical students would become public health specialists. In recent years the tendency has been to recognize that most students would become practitioners of medicine, and to teach prevention, positive health, constructive medicine, eubiotic medicine, social medicine, however one chooses to define it. Efforts are*

being made to concentrate more upon a kind of teaching which students can readily see applies to their future practice. This requires full-time teachers thoroughly informed, not only about public health and preventive medicine, but also of progress in medicine generally. Emphasis is being placed upon the social problems which accentuate as well as cause ill health, and on the community defenses erected or needed to combat such difficulties."

B. The After-Effects of Military Medicine in World War II. Whatever the military and political consequences of the war may have been, one result was the exposure of a large majority of the young men of this nation to a program of comprehensive health care that was prepaid, without deductibles or coinsurance, and that covered much of the health care of their families. For many, especially for the poor, this was the first exposure to readily available health care, conveniently situated, and provided without much evidence of bias. It is not clear that the latter statement is in fact valid, and it is regrettable that there are not more data on this point. Nevertheless, this experience undoubtedly had much to do with the now prevalent notion that every citizen has the right to free medical care.

The physician (and most younger physicians were in the armed forces) was also exposed to prepaid health care for which he received a salary. For many it was undoubtedly a revelation that under such circumstances physicians did a committed and responsible job. Notable also is the fact that many newly graduated physicians received at least a part of their education free, in addition to living expenses, in return for a commitment to about 2 years of service. Subsequently, this program became the model for government support of the costs of medical education in return for later service.

The medical officer in the armed forces was usually responsible for a defined population, a group of men for whom he had a general and often a comprehensive responsibility. This may have been the first situation in which many physicians clearly identified to themselves a population for which they were responsible, not only at sick call, but also for the public health setting in which care was being provided. For medical officers on ships, with field units, or for families at a fixed base, the physician had both the opportunity and responsibility to be concerned, not only about clinical disorders, but also about the prevention of situations that exposed his population to risk. In some cases he was assigned to a specific public health responsibility, and, just as in the aftermath of other wars, many of these physicians took up public health assignments, with a number of them going into departments of preventive medicine.

For many medical officers the war was their first experience in having to allocate scarce resources, particularly at times of crisis. The basic military principle of keeping the maximum number of men on duty was exquisitely evident at the time of a kamikaze attack. In normal circumstances, a physician would have a clear responsibility to spend his time with the most severely injured, but during attack, it was important to keep as many men at the antiaircraft guns as possible. As a result, physicians were faced with the necessity of giving first attention to those with minor injuries. Due to the lack of optimal resources, there were other circumstances when they were faced with painful decisions as to which patients to evacuate and what amount of care to provide a seriously injured patient before evacuation. The use of optimization techniques was long delayed in medical care planning, and has only now begun to show itself conspicuously, but these wartime experiences were an important breaking of the ground.

C. The Impact of Increased Research Funds. The rapid growth in support for research following World War II had a profound effect on all medical school activities. Prior to this time, funds for the support of medical school departments had flowed through the dean, who could plan an appropriate division of activity and responsibility. With the appearance of external research funds, individually applied for, the growth of medical school departments became more dependent upon the vigor, academic standing, and entrepreneurship of an investigator or departmental chairman than upon an overall school policy or program. Since most monies were categorically oriented, departments with a more general concern, such as preventive medicine, were required to work in categorical areas in order to obtain research funds. Proportionately fewer research funds flowed into departments of preventive medicine than into other departments. In 1963, only 1.4 percent of U.S. Public Health Service grants went to departments of preventive medicine (*2*).

During the period between 1950 and 1970, 27 percent of the total output of United States' medical schools was diverted to the increase in faculty positions and residency training programs. In this period, when 162,603 students were graduated (*4*), full-time faculty positions increased from an estimated 9,000 to 28,099 (*5*), and the number of residents in training increased from 14,495 to 39,463 (*6*).

This diversion greatly reduced the expected increment in practitioners, and those that chose to enter practice increasingly headed for careers in specialty medicine. In this was the origin of a deficiency which subsequently became an important political and health care issue. At a relatively early stage, deans and other medical leaders recognized an important gap appearing in the preparation of medical students and young physicians; they attributed this gap to a lack of sense of responsibility for comprehensive health care needs of patients. Since the beginning of the clinical clerkship as a revolutionary development in medical education, almost exclusively an in-hospital experience, there had been the risk that the extramural needs of patients would be overlooked. The evolution of social casework and the development of social work rounds in medical education had countered this trend to some extent, but with the development of an increasingly specialized faculty and administrative structure in medical schools, the comprehensive needs of patients were generally overlooked. Departments of preventive medicine were expected to cope with this gap.

Increasing specialization had the corollary effect of little interest in meeting general medical responsibilities, particularly within the area of ambulatory care. Specialists largely confined their attention to patients referred for specific problems and increasing specialization of the out-patient clinic took place. This made it difficult to man the clinics and provide continuing care to patients with general medical care problems, although in many institutions service in the clinic remained the *quid pro quo* for staff membership. With increasing specialization there were insufficient personnel for the general medical and pediatric clinics and for their supervision, and it became a common responsibility for departments of preventive medicine to fill the supervisory function, often assuming overall coordination of responsibility for both ambulatory care and teaching. However, in many institutions, departments of medicine and pediatrics retained these responsibilities.

Initially, rehabilitation was seen as a portion of comprehensive care of patients that did not fit neatly into a specialty category, and it was sometimes assigned to the department of preventive medicine. University health services also offered opportunities for studying the comprehensive care of students, and in many schools this too became a responsibility of preventive medicine.

Concern with meeting comprehensive care needs was oriented to individual patients. It was a far cry from the movement that developed in the 1960s for the organization of comprehensive health care systems. An occasional voice was heard insisting on more comprehensive health care coverage in financing, beginning with the Social Security Act of 1935, in which health insurance was almost included. During the 1940s, the Murray-Wagner-Dingle Bill made health insurance a national issue, and some departments of preventive medicine were involved in teaching about these matters at an early stage. For others, the focus was on the comprehensive health care needs of individual patients. This led to emphasis on discharge planning for patients, the needs of patients after leaving the hospital, and the contributions that could be made by community agencies. There was little medical school involvement in the experiments in New York and on the West Coast with comprehensive prepaid medical care, although New York University for a time sponsored a Hospital Insurance Plan (HIP) group practice, which later was forced to seek other auspices due to pressure from medical alumni.

During the 1940s and 1950s there was a mushrooming of voluntary health agencies which were categorically oriented to the control of such diseases as cancer, heart disease, multiple sclerosis, alcoholism, mental retardation, etc. There had been a long tradition of such agencies (witness the American Tuberculosis Association, see Gunn and Platt) (7) which long had been active in promoting disease control through increased public funding as well as voluntary contributions. In many instances voluntary agencies provided direct patient service, particularly case finding, social service, and health education. By the early 1950s, however, there was a tendency to move away from direct service and stress instead the support of research and public education.

The availability of services from these voluntary agencies has varied considerably from one community to another, but in many instances, these services significantly supplemented the care available from other sources. Indeed, the development of such agencies can be viewed as a response to gaps in the health care system. Departments of preventive medicine, in teaching medical students about the comprehensive care of individual patients, often found it useful to acquaint them with these agencies and their services, and not infrequently involved students in special agency projects.

D. Federal Legislation. The failure to enact national health insurance in the 1940s undoubtedly exaggerated the effect of the monies poured into research, in that national health insurance would have created a demand for increased numbers of primary care physicians, while categorical research monies have tended to increase the number of specialists. The passage of Medicare, Medicaid, and Regional Medical Program legislation in 1965 and of the Comprehensive Health Planning Act in 1966 had additive effects. Increased monies for health care for the aged and the poor strained the medical care system, and brought to light the fact that even with monies offered for services, many of the poor had difficulty in obtaining personal physicians or personalized or dignified care in institutional settings. The rapid rise in health care costs, which was partly responsible for the legislation, created in turn a new popular pressure for protection against catastrophic costs.

The advent of comprehensive health care planning agencies offered a special opportunity for academic programs to become involved in planning and evaluation, but many of the planning agencies were by chance or accident remote from geographic or psychologic identification with medical school settings. These agencies often lacked authority to act effectively, and in many instances were so preoccupied with immediate political problems that there was little attempt to exploit advanced tools of management or decision making. Some departments of preventive medicine did become actively involved with planning agencies, but there was uncertainty on both sides. The planning agency, for its part, was apt to question the ability of the university to be responsive to public need. Universities, on the other hand, were reluctant to be thrust into policy making for which they would bear responsibility as decision makers rather than as investigators. In spite of these problems there were great opportunities for departments of preventive medicine to play a significant role with planning agencies. They often provided much needed expertise in epidemiologic, administrative, and health care fields.

By contrast, the Regional Medical Programs, which had been seen as devices for helping the diffusion of knowledge from the medical center to the community, moved in categorical directions, and only in their later evolution were aimed at improving health care delivery. In any event, departments of preventive medicine were faced with increasing involvement in problems of health care delivery, lack of financing, and needs of deprived segments of the population, such as the aged and the poor. A concern for patients in settings outside the acute general hospital, and a relationship with outside agencies, led to the involvement of the department with chronic disease hospitals, home care, inner city populations, and American Indians.

Legislation that supported manpower training in public health provided significant support to departments of preventive medicine, especially in the development of graduate training programs. The stimulating effect of graduate students on research and teaching was coupled with the preparation of specialists in various preventive medicine disciplines. Summer programs for medical students considerably enhanced their exposure to community health projects and the skills needed for such work.

E. Student Unrest in the Late 1960s. The wave of unrest that appeared on college campuses had its parallel in medical schools. While there also was much emphasis on the unresolved war in Indochina, much of the concern was oriented around unmet medical care needs. Since this was an area that had been assigned to, or been absorbed by, departments of preventive medicine, it was not surprising that many student movements interacted with a home base in departments of preventive medicine. In turn, they stimulated such departments to efforts and activities that otherwise might not have been initiated. Many free clinics were student sponsored. Students were a potent force for awakening medical faculties to the unmet needs of inner city areas particularly. Organizational activity took place at a national level, not only among medical schools but between disciplines. National student groups (Student American Medical Association and Student Health Organization) supplied students from medicine, nursing, dentistry, pharmacy, and social work for work together in certain of these free clinics. This was a further contribution to the evolution of interdisciplinary health teams. It is interesting to note that many of the student leaders in these activities in subsequent years became leaders of a movement toward family medicine as one approach to the scarcity of personal physicians. It is important to recognize that family medicine is a genuine movement and not merely a form of replacement for general practice. Although there is a concern for overall needs of patients, this is coupled with a demand for higher quality in general care and improved tools of communication and management.

F. The Resurgence of Family Practice. It is difficult to sort out the influences which led to this movement. The decline in the number of personal physicians, the political pressure resulting therefrom, the willingness of state and federal legislative bodies to allocate monies for training in family practice, the activism resulting from student unrest all have played a role. The movement is still in its infancy and emphasizes getting a job done. While there has been little attention to research, there are indications that more rigorous planning and evaluation are under way. From the beginning, family practice spokesmen have been concerned about adequate patient records, and they were among the early advocates of the problem oriented record. In addition, they have developed registries of diagnoses and complaints so that a substantial body of ambulatory care material is becoming available.

G. The Crisis of Identity. The continuing emergence of new responsibilities—the migration from public health to comprehensive health care for the individual and on to the organization and evaluation of health care delivery systems—reflects considerable flexibility and resiliency in departments of preventive medicine. This accounts in part for the concern with the identity of such departments, their unique responsibilities and skills, and where they are going. No other discipline has experienced so rapid a shift in responsibilities and activities. One sign of changing responsibility and focus is to be found in the titles of departments (Table 1). By and large, the change has been in the direction of substitution of the term "community health" for "preventive medicine."

While there is advantage to flexibility in role and title, this has also led to difficulties in promoting the best interests and needs of the discipline since not all educators, legislators, or civil servants perceive the features in common among these variously titled departments. As to the advantage of initiative for changing its set of responsibilities, such a department by definition becomes an agent for change within the university and community and is more prepared to deal with new demands or circumstances than other departments. While it presents grave problems, this status offers great opportunities.

TABLE 1. Titles of Departments of Preventive Medicine in the United States

Title	Number of Instances	
	1964[a]	1972–73[b]
Preventive Medicine	29	11
Preventive Medicine and Public Health	17	7
Public Health	7	2
Public Health and Preventive Medicine	6	1
Preventive Medicine and Community Health	5	5
Community Health	2	5
Community Medicine	1	20
Community and Preventive Medicine	0	3
Community and Family Medicine	0	2
Community Health and Preventive Medicine	0	2
Epidemiology and Public Health	1	2
Family and Community Medicine	0	2
Preventive and Community Medicine	0	2
Preventive and Social Medicine	0	2
Community Health and Medical Practice	1	1
Environmental Medicine and Community Health	1	1
Epidemiology and Community Medicine	1	0
Hygiene and Preventive Medicine	1	0
Industrial Medicine and Hygiene	1	0
Preventive Medicine and Administrative Medicine	1	0
Preventive Medicine and Environmental Medicine	1	0
Preventive Medicine and Genetics	1	0
Preventive Medicine and Industrial Health	1	0

TABLE 1—continued

Title	Number of Instances	
	1964[a]	1972–73[b]
Preventive Medicine and Rehabilitation	1	0
Social and Preventive Medicine	1	1
Tropical Medicine and Hygiene	1	0
Virology and Epidemiology	1	0
Biostatistics and Epidemiology	0	1
Community and Environmental Medicine	0	1
Community Health and Family Practice	0	1
Community Health and Social Medicine	0	1
Community Health Practice	0	1
Community Health Sciences	0	1
Community Medicine and Health Care	0	1
Community Medicine and International Health	0	1
Community Medicine and Public Health	0	1
Environmental and Community Medicine	0	1
Environmental Health	0	1
Epidemiology and Environmental Health	0	1
Family and Community Health	0	1
Family Medicine and Community Health	0	1
Family Practice and Community Health	0	1
Health Services Education and Research	0	1
Human Ecology	0	1
Preventive Medicine and Comprehensive Health Care	0	1
Preventive Medicine and Environmental Health	0	1
Public Health and Epidemiology	0	1
Social Medicine	0	1
Tropical Medicine and Public Health	0	1
Divisions (including specialties without organizational autonomy)		8
Schools of Public Health responsible for teaching		2
No department (including 8 newly established schools[a])	13	12[a]
Total	94[c]	113

[a] Shepard, WP and JG Roney, Jr 1964. The Teaching of Preventive Medicine in the United States. Milbank Mem Fund Vol XLII, No. 4, Part 2 October.

[b] From the 1972–73 AAMC Directory.

[c] In two institutions there were two separate departments.

Titles of Departments of Preventive Medicine in Canada

Title	Number of Instances
	1972–73[b]
Social and Preventive Medicine	3
Community Medicine	2
Preventive Medicine	2
Clinical Epidemiology and Biostatistics	1
Community Health and Epidemiology	1
Community Health Science	1
Epidemiology and Health	1
Epidemiology and Preventive Medicine	1
Health Care and Epidemiology	1
Preventive Medicine and Public Health	1
No departments	2
Total	16

THE CHANGING SCENE IN DEPARTMENTS OF PREVENTIVE MEDICINE

A. Personnel and Budget. As with all academic departments, the availability of research and training grants led to a substantial increase in budget during the 1950s and 1960s. Leavell (*3*) reported in 1941 that 55 percent of the medical schools had one or more full-time faculty members in preventive medicine. This number had not increased substantially by 1952, when the Colorado Springs Conference (*8*) found in 83 schools an average of 1.4 to 3.2 members with a range of 0 to 19 and a median of between 1 and 2 faculty members. In 1960, Leymaster (*9*) surveyed 58 selected departments of preventive medicine. There were 272 full-time professional faculty members, with an average of 4.7 per department. Four departments had no full-time staff members. Fifteen percent of the full-time faculty received half or more of their salary from federal sources, and 19 percent received some basic salary from the federal government. By 1964, Shepard and Roney (*10*) found a range of 0 to 29 members in 78 schools with a mean of 4.8 members. Eighty-eight percent of the departments now had one or more members. Of these 78 departments, 39 percent had physician faculty members only. Entwisle (*11*) observed in 1968 that 64 reporting departments had an average of 8 budgeted faculty posts. Two hundred and twenty-one were full-time physicians, but 63 posts available for physicians were unfilled. There were 170 nonphysician faculty members, and 31 unfilled posts for nonphysician faculty members.

There was a delay in increase in size of faculties in departments of preventive medicine, for a large increase had occurred in most departments prior to 1964. Some indication of this can be gathered from budgetary figures. In 1944, Mustard (*12*) reported an average departmental budget of $5,700 which represented 3.4 percent of the average medical school budget.

In 1960, the Association's Committee on Research and Training (chaired by Shank) (*13*) reported on the results of a survey with responses from 65 to 83 departments. Schools of public health, even though providing the teaching obligations of a department of preventive medicine, were not included in the survey. A total of 250 research projects were reported at that time with support in excess of $5 million (or an average of $77,000 for the 65 departments). Of this amount, 69 percent came from governmental agencies, 12 percent from private foundations, 8 percent from industry, and 2.3 percent from within the medical school.

By 1963 (*2*) a breakdown of monies distributed by the Public Health Service and voluntary agencies indicated that 1.4 percent of Public Health Service grants were assigned to departments of preventive medicine (a total of $6,314,301). This was represented by 183 grants. In addition, 19 grants had been received from voluntary agencies amounting to $472,000. At that time only a third of the departments had training grants. More significant information was available in the Entwisle report (*11*) of 1968. Information from 64 schools at that time can be tabulated as follows:

	University	Research Grants	Training Grants
Median	$62,990	$ 23,572	$24,500
Mean	$91,664	$125,280	$46,015

The university monies on the average represented only 1.8 percent of the medical school budget. Thirty-nine percent of the departments had no research grants and 30 percent had no training grants. The average departmental budget in toto amounted to $263,000.

While university contributions had increased absolutely over the years, in 1969 the departments of preventive medicine accounted for only 1.8 percent of medical school budgets, while in 1944 they had accounted for 3.4 percent. In 1972, the Association of American Medical Colleges made a cost allocation study (*14*). Twenty-two medical schools were used in the calculations of a mean and median percent of the school budget assigned to preventive medicine. These schools were Tufts, Iowa, Illinois, Medical College of Wisconsin, Duke, Ohio State, Case Western Reserve, Missouri, Alabama, Mount Sinai, State University of New York—Syracuse, Vermont, Georgetown, University of California, Kansas, Albany, St. Louis, Hahnemann, Creighton, Nebraska, Medical College of Pennsylvania, and Arizona. Although the fiscal years studied vary among the schools, all amounts have been adjusted to 1972 dollars. The percentage for preventive medicine ranged from a minimum of 1.0 percent to a maximum of 8.0 percent. The mean was 2.0 percent as was the median.

It would be interesting to know whether this rather small support for preventive medicine reflects a preferential conscious decision by medical school administrations to favor other departments. The major growth in departments by 1969 was in research grants and to a lesser extent in training grants. It may be speculated that the somewhat delayed growth in department budgets was related to the effects of new types of training grants available through Public Health Service manpower programs and through various kinds of community programs in which departments of preventive medicine was especially involved.

B. Administrative Structure. There continue to be some medical schools without formal departments of preventive medicine.

	1944	1952	1964	1972
Number of Schools	78	83	92	114
Separate Department	46 (59%)	54 (65.1%)	71 (77.2%)	90 (79.0%)
Combined Department	25 (32%)	21 (25.3%)	8 (8.7%)	7 (6.1%)
Other or None	7 (9%)	3 (3.6%)	13 (14.1%)	10 (8.8%)
Sch. Public Health		5 (6.0%)		7 (6.1%)

No substantial study has been made of schools that do not have departments of preventive medicine. Most are new schools that do not have, as yet, a fully developed academic program. In seven schools there are combined departments, and only three established schools have at present no identifiable department or section in another department. However, no medical school is lacking in a department of preventive medicine or in access for work in this area in one of the related schools of the university, unless it is a new school.

C. Teaching Time. There have been only two surveys of teaching time: one by Leavell (*3*) in 1940, and one by Shepard and Roney (*10*) in 1964. Shepard and Roney concluded that there has been no significant change in the amount of teaching time. The amount allotted in the first and second year was almost the same, about 24 hours in the first year and 48 hours in the second. In the third year there was a slight reduction from 46 to 43 hours and in the fourth year a slight increase, from 50 to 58 hours.

D. Curriculum. While traditional subject matter provided the backbone of preventive medicine teaching in the 1920s and 1930s, interesting departures allowing new directions evolved in the 1930s, such as that made possible by the New York City Health Department. The department built health centers adjacent to each of the medical schools, made 25 percent of the space available, and gave access to their personnel and clientele for teaching purposes. This allowed the schools to house a full-time chairman, and other staff, and to establish full-time clinical clerkships.

Involvement with public health agencies was stressed at the 1946 Ann Arbor Conference sponsored by the Conference of Professors of Preventive Medicine. In its review of teaching programs in preventive medicine (*15*), the Committee on Teaching Content and Methods—Preventive Medicine recommended:

> *That the instruction include biostatistics; epidemiology; physical, biologic and social environmental factors involved in the preservation of health; and the control of disease. It is recognized that this is a broad concept and covers information relative to the prevention of disease, the protection of health, and the prolongation of life. It is further recognized that the problems involve both individual and community health. We are cognizant of the fact that the mode of presentation of the above may vary considerably in the various medical schools. We urge, however, that the departments of preventive medicine and public health maintain responsibility for the dissemination of such information to medical students either in their own departments or by suitable arrangements with other departments.*
>
> *As to methods, we recommend:*
>
> *1. That clinical, environmental and social approaches be used wherever possible and to the extent that may be most effective.*
>
> *2. That audio-visual aids in teaching preventive medicine and public health be developed and used where they may be of value.*
>
> *3. Small group teaching, using conference and laboratory methods with student participation wherever possible.*
>
> *4. That time be devoted to student participation in health department activities.*
>
> *5. That field trips and demonstrations be used when possible.*

A summary (*16*) of other recommendations from this conference is included as Appendix A. It will be noted that social and economic issues figured prominently.

A smaller report (of the "Mustard Committee" chaired by Dr. Harry S. Mustard, for the Executive Council of the Association of American Medical Colleges) (*12*) suggested a curriculum in a 1944 report that emphasized statistics, epidemiology, natural history of disease, the concept of disease as a mass problem, environmental factors (including biological, physical, economic, and social), sanitation, and a variety of community issues. In addition, however, one other component sounds strangely current:

> *The student must be stimulated by problems which lead to a consideration of the health status of the individual's family; how the racial, hereditary, cultural, educational, social, economic, and psychological background of that family may have played a part in the mental or physical health of the individual, and the possible operation of those factors in the present and in the future.*

In spite of this rather broadly conceived curriculum, there is no mention of the organization and financing of health services or the development of a comprehensive health care program. However, there was considerable interest in this area in some departments.

During the 1950s, there was general emphasis on the comprehensive care needs of individual patients, and a reduction of visitations to public health facilities. More recently, active involvement in the work of community agencies or health delivery systems has appeared, even for first year students. In many instances they play an active role in community organization, health education and health advocacy, and, in the last 10 years, in the development of free clinics in inner city communities. Such activism would have seemed very strange in the 1940s, when community programs were limited to providing physical examinations for children in settlement houses, or performing home deliveries under a required program in obstetrics.

E. Block Electives and Field Experience. The active involvement of students in community health activities often has been extended into summer electives or block electives. In 1968, Entwisle (*11*) found that 48 of 64 departments reporting had student fellowship programs of more than 4 weeks duration and in that year more than 409 students were participating. These programs often involved medical care delivery or a health education assignment for a target population in an inner city or rural area. In other instances they involved more rigorous study, using epidemiologic techniques.

A remarkable early effort was that of the National Foundation (*18*) to promote interest in preventive medicine and public health. Between 1953 and 1959, they gave 733 student fellowship awards to preventive medicine and public health, and several hundred more in rehabilitation. This program was terminated in 1960.

Particular note should be taken of the extraordinary contribution of Dr. Robert Dyar of the California State Department of Health to epidemiologic field work. Over a period of 11 years (from 1958–70) several hundred students, from 20 to 40 a summer, were assisted in planning an epidemiologic field study, making observations, and analyzing and making a final report. This model was adopted by a number of medical schools, in spite of considerable disbelief that any field study of merit could be completed in a period of 10 weeks.

F. Research Activities. Not much is known about research activities in departments of preventive medicine prior to the Colorado Springs Conference of 1952. At that time 17 departments had research programs in epidemiology, 12 or more in infectious disease, 11 in parasitology and related fields, 15 in clinical trials, and a scattering of other activities in administrative research in medical care, etc.

In 1960, the Shank Committee (*13*) found that 13 of 65 departments reported no research projects underway, but the other 52 were involved in 251 projects as follows:

	Number	Percent
Maternal and Child Health	4	1
Nutrition	6	2
Mental Health	13	5
Infectious Disease	96	38
Chronic Disease	52	20
Medical Care	20	8
Rehabilitation	6	2
Environmental Hazards and Toxicology	20	8
Accidents	3	1
Public Health Administration	17	6
Statistics	4	1
Teaching Procedures	4	1
Miscellaneous	6	2

In addition to identifying these topical areas the Shank Committee classified the projects by the major methodologies used in the studies. The predominant approach was through the laboratory (86 projects). Epidemiology accounted for 55, surveys for 12, evaluation and/or attitude testing for 22, clinical research for 5, sanitary engineering for 5, statistics for 12, and genetics for 9. The committee also drew attention to the large amount of cooperative research with other medical school departments or community agencies. Some 50 projects of this kind were identified.

By 1963 the predominant emphasis in infectious disease was still evident with 37 percent of departments having research in microbiology (probably including major emphasis on epidemiology). These proportions will have changed by 1973, but there is no recent survey. There probably has been an increased emphasis in the last few years on health care research in a variety of ways including use of epidemiologic techniques. Furthermore, in some departments, research activities and medical student and graduate teaching has included economics, systems analysis, and other management skills. This development is intimately connected with the concern for improved health care delivery, the need to prepare health care system managers, planners, and evaluators, and the requirements that these activities place not only on descriptive and analytic sciences but on optimizing skills as well. The survey techniques of epidemiology, sociology, and market research are closely allied. While they can give clues to human behavior and the origin of disease or the origin of health behavior, they do not of themselves provide the techniques for optimizing the use of scarce resources, either in terms of cost benefit analyses or allocation decision models. It is likely that in the foreseeable future there will be a strengthening of these trends in terms of management skills and also in terms of the application of knowledge derived from behavioral sciences (sociology, psychology, cultural anthropology, political science, and economics) to the optimal development of health care systems.

G. Graduate Student Programs. Graduate training is pretty much a franchise of the schools of public health. In some cases, however, fairly large departments of preventive medicine have developed graduate training programs, but this was frequently a precursor to evolution as a separate school of public health. In 1963 there were 42 graduate students in departments of preventive medicine in medical schools. By 1968 there were 51 residents in residency training programs and an unknown number in graduate programs (*11*). Further studies need to be made of this development.

H. Health Education. A number of departments of preventive medicine and schools of public health have more or less active training and research programs in the field of health education. Recently a survey was made of consumer education by departments of preventive medicine (*17*). Of 63 schools that replied, about a third said they were involved in health education activities. The remainder said they were not and had no immediate plans for future programs, although many were involved in programs of health promotion that might qualify as health education. Of the 20 schools involved in health education, only 5 were involved directly in educating the at-risk groups in the community and the others concentrated their efforts on visitors to their facilities. Three schools were utilizing television; one had some involvement with radio.

PROGRAM RELATIONSHIPS TO SCHOOLS OF PUBLIC HEALTH

There has been considerable variation in the contact or communication between medical school departments of preventive medicine and schools of public health. In the preparation and conduct of periodic national conferences a number of professors from schools of public health have assisted the Association of Teachers of Preventive Medicine by preparing position papers and attending the conferences. There are exchanges of lecturers, and many chairmen at schools of public health were formerly on the staff of medical school departments of preventive medicine.

Curiously enough, this failure to communicate is sometimes most evident in universities where both kinds of schools coexist. Where a school of public health has the de facto role of the department of preventive medicine—Yale, Tulane, Washington (Seattle)—there is no uncertainty because the school has a single identity.

When departments of preventive medicine have considered their activities vis-a-vis schools of public health there has usually been a ready acceptance of the notion that schools of public health should continue to carry the major responsibility for training epidemiologists, biostatisticians, sanitarians, health educators, and health administrators.

Perhaps one reason for delay in the development of graduate training programs in departments of preventive medicine is that the field is so broad that it is difficult to have faculty in depth in a particular area of expertise. This is perhaps the principal reason why the training of epidemiologists and biostatisticians has been largely left to the schools of public health (and in the case of biostatistics to other university settings). A critical mass of a variety of epidemiologic personnel is needed to mount a successful graduate training program, and it would be very unusual to find such a group in a department of preventive medicine. Only since preventive medicine's increasing involvement in health care research, has it seemed feasible to mount graduate programs.

In schools of public health, a belief in the necessity of supervised extramural experience as a part of learning administrative skills has not appeared. By contrast, activities in departments of preventive medicine often have been intimately involved in the provision of health care services, and much of the teaching done in a clinical setting. Indeed, there has been some speculation as to what the fate of schools of public health might have been if they had copied the clinical clerkship model, i.e., learning under supervision while involved in the provision of services. It is a good deal more complicated to create such a relationship with a health department than with a hospital, but substantial arguments can be advanced in favor of this arrangement.

Although these historical relationships can be readily explained, it is evident that with the movement of interest in departments of preventive medicine toward health care planning and evaluation and delivery in a comprehensive sense, there is an increasing need for the skills which have, until now, been concentrated in schools of public health. The application of epidemiological and biostatistical techniques to health care evaluation is a good example. On the other hand, it is likely that the problems of patient compliance with prescribed regimens will be a major focus for the next 10–20 years (perhaps always), and a great variety of skills including health education, community organization, communication science, and behavioral science will be needed to carry out these programs effectively. More than ever there is need for readier communication of concepts, skills, and experience between schools of public health and departments of preventive medicine.

SUMMARY

Teaching and research in departmes of preventive medicine have followed the same broad trends observed in the field of public health generally, and in schools of public health. While concern with infectious disease remains a major interest in many departments, others have emphasized programs in the field of health care delivery. Epidemiology and biostatistics continue as basic disciplines within departments of preventive medicine.

The location of departments of preventive medicine has led to more clinical involvement and less graduate training than in schools of public health. In 1973 this was most evident in relation to the organization and evaluation of comprehensive health care delivery systems.

APPENDIX A

VICESIMO ANNO

Ed. Note: *After 20 years, it is of interest to look back at the first set of policies ever advocated for medical education by professors of preventive medicine in this country. The occasion was the Ann Arbor Conference of 1946, the predecessor of the Colorado Springs and Saratoga Springs assemblies. The meeting was held in the name of the Conference of Professors of Preventive Medicine, subsequently, reconstituted as this Association in 1954. The statement is of interest on several counts. In its day there were few if any comparable statements from other branches of American medical education. The durability of the principles proposed and predictions made are open to the judgment of each reader, as are the goals as yet unmet.*

Preventive Medicine

I. Report of the Committee on Philosophies and Objectives

We believe that the prevention of disease and the conservation of health, physical and mental, constitute a major obligation of society. The medical profession has the ethical responsibility to provide the necessary direction and leadership toward achieving such goals. Medical schools and their faculties therefore have the inescapable duty to assume an aggressive role:

1. In the advancement of learning in the field of health;
2. In the preparation of students with the necessary knowledge and skill derived from the physical, biological, and social sciences;
3. In the education of the public to apply the principles of preventive medicine.

To achieve such objectives medical schools must provide, as an integral part of their organization and structure, sufficient full-time personnel qualified in preventive medicine; and adequate funds, facilities and teaching time.

Teachers of preventive medicine shall devote their energies:

1. To the education and inspiration of their colleagues and students;
2. To the study of problems of health in their social settings;
3. To the development of methods for solving these problems;
4. To the education of the people in the availability and proper utilization of all community resources.

Finally they shall foster the education of all members of society in their personal responsibilities for their own health and for that of their fellow man.

II. Report of the Committee on Teaching Content and Methods—Preventive Medicine

As to content, the Committee recommends:

That the instruction include biostatistics; epidemiology; physical, biologic and social environmental factors involved in the preservation of health and the control of disease. It is recognized that this is a broad concept and covers information relative to the prevention of disease, the protection of health, and the prolongation of life. It is further recognized that the problems involve both *individual* and *community* health. We are cognizant of the fact that the mode of presentation of the above may vary considerably in the various medical schools. We urge, however, that the departments of preventive medicine and public health maintain responsibility for the dissemination of such information to medical students either in their own departments or by suitable arrangements with other departments.

As to methods we recommend:

1. That clinical, environmental and social approaches be used wherever possible and to the extent that may be most effective.
2. That audio-visual aids in teaching preventive medicine and public health be developed and used where they may be of value.
3. Small group teaching, using conference and laboratory methods with student participation wherever possible.
4. That time be devoted to student participation in health department activities.
5. That field trips and demonstrations be used when possible.

III. Report of the Committee on Preventive Medicine Curriculum Planning

. . . there should be a degree of flexibility on the part of individual schools in developing their curricula and that any of the recommended subjects may be given in combination one with the other as desired.

We recommend:

1. That the teaching of public health and preventive medicine be started not later than the second year and be continued in each year thereafter.
2. That the teaching of biostatistics be inaugurated in the curriculum at the earliest practical time for adequate correlation with the teaching of courses in the basic sciences, and further that additional experience and use of the statistical method be provided in courses during the clinical years.
3. That there be included likewise as early as practicable an introductory orientation outlining the general field, purposes, and activities of public health and preventive medicine.
4. The teaching of epidemiology simultaneously with or following the courses in medical bacteriology, parasitology and biostatistics.
5. The teaching of environmental sanitation simultaneously with or following the courses in medical bacteriology and parasitology.
6. The teaching of public health administration and of industrial health at times in the curriculum when they can be correlated best with related subjects.
7. The teaching of clinical preventive medicine and the sociologic aspects of disease and health as a part of or correlated with the clinical courses of study.
8. That the desirable minimum hours in preventive medicine and public health including health economics be approximately 4 percent of the total clock hours of the medical curriculum.

In making these recommendations the Committee foresees in schools of basic medical sciences (two-year schools) conditions which may make it advisable that these subjects be integrated or merged with courses in one or more already organized departments.

The Committee considered the question of distribution of the subjects in preventive medicine and public health with respect to hours and deemed it inadvisable to make specific recommendations.

Health Economics

I. Report of the Committee on Teaching Content, Methods, Curriculum Planning and Teaching Personnel

In line with the recommendation adopted by the Council on Medical Services and Public Relations of the American Medical Association to have each medical school give a course on medical sociology and medical economics, and in accordance with the recommendation of the Joint Committee of the American Public Health Association and the Association of American Medical Colleges to the same effect, the Committee recommends that:

1. In all medical schools, as soon as possible, basic factual instruction be provided in the following subjects:

A. Socio-economic aspects of illness, including:
   1. Effect of socio-economic conditions on health. These socio-economic conditions include population composition, housing, nutrition, income, occupation and other factors affecting the health status of the people.
   2. Effect of illness on socio-economic conditions of individuals, families, communities and nations.
   3. Significance of improved socio-economic conditions in the prevention of disease and in the reduction in frequency and severity of illness.

B. Methods of providing health services and medical care including:
   1. The historical development of health services and medical care.
   2. The present structure of health services and medical care.
   3. The available resources of facilities and personnel.
   4. The quantity, quality and cost of health services and medical care.
   5. Individual practice and group practice.
   6. Types of organization of preventive, diagnostic and treatment facilities.

2. In addition to the above subject matter, provision be made for presentation of the points of

view of important professional and other organizations concerned.

3. In order to make the teaching of the above subject matter as authoritative and effective as possible, provision be made for:
    A. Intensive courses of instruction for teachers of this subject, followed by visits to agencies administering programs of health services and medical care.
    B. Pertinent literature, syllabi and other teaching aids.
    C. Periodic regional or general institutes for instructors in health economics.
4. The services of a few experts in the teaching of health economics be secured to visit schools upon their invitation for the purpose of stimulating and supplementing instruction in this subject.
5. The assistance of foundations be sought for the implementation of these recommendations.
6. The Association of American Medical Colleges and the Council on Medical Education of the American Medical Association be strongly urged by a formal communication from this Conference to consider the matter of the requirement of instruction in the social sciences (sociology, economics, government and psychology) as prerequisites to admission, at the sacrifice, if necessary, of some of the present requirements; and that this change in requirements be instituted as soon as possible.

II. Report of the Committee on the Training of Administrative Personnel

The views expressed by the Committee are not presented with the intent of any official action, on the part either of the Conference of Professors of Preventive Medicine or of the Association of Schools of Public Health at this time, but rather with the intention of (emphasizing the need of) a better understanding of the field of medical administration and for a more carefully considered approach to the selection and training of the individuals who may enter it.

The Committee recognized the need for further study and definition with respect to all types of administrative personnel associated with the broadening field of public health, but restricted its consideration largely to the problem of the health and medical administrator as exemplified by the full-time health officer, the hospital administrator, the administrator of a medical care program, or the administration of a medical service insurance plan.

The Committee gave careful consideration to the definition of the fields of service for which such personnel will most likely have to be trained. It considered the traditional functions of the health officer and the fact that, with few exceptions, graduates in the degree of Master of Public Health, Diploma in Public Health, or Doctor of Public Health from the schools of public health are being trained and equipped only to carry out a restricted field of function. The Committee is aware of the difficulties and avoidable handicaps imposed upon such personnel when faced with the obligation of conducting a far-reaching and complicated program such as the Federal EMIC program, or with the conduct of a medical care program for the medically indigent or the responsibility, imposed upon many of them, for the planning, coordination and supervision of hospital services, by such measures as the Hospital Survey and Construction Act.

It is the opinion of the Committee that such programs as these and the duties that they impose upon unprepared administrators, will see rapid increase in number and in the breadth of functions that they embrace. We have taken the view that these events can no longer be viewed by the universities with detached academic interest and as a trend that should be watched; but rather that they are forerunners of an accomplished change in the medical-social philosophy of the nation.

The Committee did not view it as its function to discuss the reasons for, nor the relative merits of these events and what they may be considered to portend. It believes that we face a factual problem. It is a problem of need and of a responsibility on the part of the universities to prepare for a growing demand as well as to act in the public interest by doing the best job that can be done in the selection for training and the preparation of the requisite administrative personnel.

To summarize this phase of the Committee's discussion would, in brief, result in a much more comprehensive interpretation of the field of public health than the one that has determined the curriculum content in the training program of the past.

We believe that the point has been reached in the recognition of our national and local needs for the organization, integration and operation of public health, hospital and medical services where their administrative functions can no longer be considered as distinct and separable. It is necessary for the health officer to understand the underlying problems and principles of hospital service and of medical service plans. It is desirable for the administrators of these latter two types of service to be fully alert to the problems and opportunities of a basic public health program. In certain circumstances, administrators in one of these fields are being called upon to supervise functions in another or to coordinate one or more of them with their own programs. Particularly is this true of the health officer.

Therefore, it is the opinion of this Committee that:

1. Basic training of health and medical administrators (doctors of medicine serving in the administrative fields of health, hospitals or medical care) should be similar for those entering any of the fields mentioned.
2. Basic training should embrace the fundamental skills common to all fields of health and medical administration. And in addition, it should include substantial orientation in the several specialized areas that can, at present, be defined, such as basic public health and preventive medicine, hospital administration, and medical service program administration.
3. Postgraduate students (physicians) taking such instruction also should be provided with opportunity for more advanced study in these several administrative fields and this be supplemented, where appropriate, by opportunities for field or other internships as in hospital administration.
4. The foregoing areas of educational need are the local responsibility of the postgraduate schools of public health.

The Committee recommends to the attention of the Association of Schools of Public Health, the need and the urgency of conference in the planning of curriculum content. It is recognized that the results of much-needed job analyses and of future developments and experience will indicate further curriculum revision.

The Committee recommends to the attention of the Conference of Professors of Preventive Medicine the fact not only of the existence of this growing need and demand for the recruiting and training of competent health and medical administrators, but also the fact that, in their favorable position of contact with the young minds in medicine, they occupy a peculiarly advantageous position to direct the interest of qualified personnel to the field administrative medicine.

It is our opinion that the professors of preventive medicine are confronted not only by a responsibility but also by an opportunity in this respect which bears a very great obligation to the future quality of health and medical services.

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DISCUSSION

Michael Ibrahim

Dr. Berg's paper raises a number of issues that I propose to address by asking rather general questions. These can be discussed now or considered later in the course of this 2-day meeting.

1. Did departments of preventive medicine, or do they now, take on responsibilities which are of no interest, for whatever reason, to other departments in medical schools? Examples of these responsibilities which Dr. Berg had mentioned were the provision of what has been termed comprehensive needs of patients, the organization and administration of ambulatory or rehabilitative care. If these responsibilities are of no interest to other departments, why is this so and what is the impact of placing departments of preventive medicine in such a position? Are they flexible enough to absorb these kinds of assignments?
2. Why do medical schools give preferential treatment to departments other than preventive medicine departments as exemplified by budget allocation, which is something like 2 percent of the medical school budget, and/or comparative salary scales of members of the faculty of preventive medicine compared to the members of the clinical faculty?
3. Did departments of preventive medicine anticipate the contemporary health issues or did they simply act after the issues were raised? The question here is really a question of leadership in this area.
4. Are departments of preventive medicine divorced from the practice of medicine as are schools of public health from public health practice? The comment was made by several of you that people in preventive medicine generally are not trained in public health, that perhaps they are mostly clinicians, or that they are neither clinicians nor public health practitioners. In other words, has the practice base of the faculty of departments of preventive medicine been adequately defined?
5. Why is it that the curriculum offered by most departments of preventive medicine has been receiving unfavorable or, to say the least, unenthusiastic response from medical students and medical school faculty? Epidemiology and biostatistics have been two major disciplines in most departments of preventive medicine. How much of these two disciplines is really relevant to the average clinician?
6. What is to be gained by comparing the differences and similarities of departments of preventive medicine and schools of public health? What are we really trying to achieve by this comparison?

These are a few questions we should discuss here.

3

CURRENT STATUS OF RELATIONSHIP BETWEEN SCHOOLS OF PUBLIC HEALTH AND MEDICAL SCHOOL DEPARTMENTS OF PREVENTIVE MEDICINE

Lester Breslow

This paper, being prepared as part of a conference on academic relationships between preventive medicine and public health, is one of a substantial number of elements developed over the past 30 years to delineate the means of academic preparation in the United States and Canada for the field(s) called preventive medicine, public health, community medicine, social medicine, community health, and other terms.

Major efforts in this regard have included the American Association of Medical Colleges (AAMC) (Mustard) committee report of 1944 (*1*); the 1946 Conference on Preventive Medicine and Health Economics at the University of Michigan School of Public Health (*2*); the 1952 Colorado Springs Conference (*3*); the 1963 Saratoga Springs Conference (*4*); and the 1972 Asilomar Conference (*5*).

Expressions from these previous conferences on the topic of this paper include:

> *Perhaps in the term 'milieu' lies the essential difference between programs based in schools of medicine and in schools of public health. The milieu of the medical school is one in which attention is directed toward basic science and clinical application of knowledge, usually to problems of sick patients. Engrafted to this can be interest in preventive medicine and the application of statistical and epidemiological methods; but the prevailing attitudes, values, and interests are those of biological research and individual patient care. Graduate students in departments of preventive medicine located in medical schools will be exposed constantly through lectures, work experience, and contacts with associates oriented to clinical and basic science information and attitudes. The milieu of the school of public health focuses attention on broad problems affecting health, on the multidisciplinary approaches, and on administrative methods for their solution. Clinical knowledge can be engrafted on these programs but will be important only as it contributes to the solution of the larger problems. The graduate students in this setting can expect constant reinforcement of attitudes concerning the importance of public health problems and methods by which they are approached.*
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> . . .
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> *While it is more likely that certain values, knowledge, and skills will develop in one setting than in the other, there are many examples of activities flourishing in either a school of medicine or a school of public health that could prosper equally in the other setting.*
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> . . .
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> *Availability of clinical facilities and patients is often cited as the advantage of medical centers over schools of public health graduate training programs in preventive medicine and public health. The importance of these may be more apparent than real. Patient care in medical centers is directed largely to diagnosis and treatment of illness in individual patients rather than to the consideration of prevention of illness or to the study of health of groups as it concerns administrative practice. Medical centers in which departments of preventive medicine have developed special populations for clinical study may have an asset of special value for a training program. However, these often are not in the mainstream of the clinical activities of the medical center and, therefore, might be developed with equal facility by schools of public health.*
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> . . .
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> *As a department of preventive medicine considers its future it must take into account certain needs which are present in every medical center. These include the teaching of medical students in the fields of epidemiology, statistics, public health, and social medicine. Additional needs are for faculty who will incorporate prevention, comprehensive care, and rehabilitation into patient treatment and teaching activities; promote medical center interaction with the community, and develop new knowledge in the field of preventive medicine. In medical schools not associated with*

schools of public health, these functions are accomplished entirely or in part by departments of preventive medicine. In instances in which schools of medicine and public health coexist, it is not uncommon for faculty from the school of public health to assume filling the unappealing role of administrative middleman in the absence of its own resources and capacities.

. . .

Thus it seems that the forces directing departments of preventive medicine to grow will influence them in some instances to develop programs which will duplicate those of schools of public health. This does not deny nor preclude the possibility that programs in preventive medicine can be built collaboratively with schools of public health. Indeed, since most departments are not yet committed to graduate programs, it may indicate that the decisions can still be made about the respective roles that they and schools of public health will play in such programs.

. . .

It is impossible, arbitrary, and artificial to try to divide responsibilities for postgraduate education between schools of public health and departments of preventive medicine. The scope and quality of programs range widely among schools and departments and there is substantial overlap in areas of interest and responsibilities. Medical schools have many needs in the fields of preventive medicine and public health which can be met best by programs organized and conducted within these schools. In regions of the country without schools of public health, it seems reasonable to expect departments of preventive medicine to fill some of these functions in respect to the surrounding community.

Data for this paper were collected by means of a questionnaire to the schools of public health in the United States and Canada, and a questionnaire to the medical schools' departments of preventive medicine in the two countries. Returns came from all 19 schools of public health and 96 of the 127 medical schools. Copies of the two questionnaires are appended.

SCHOOLS OF PUBLIC HEALTH

Of the 19 schools of public health, 11 were founded prior to, during, or immediately after World War II, none between 1948 and 1960, and 8 following 1960. The 19 schools of public health reported a total of 4,827 graduate students during the 1971-72 academic year, of whom 2,089 received degrees during that period. Federal funds which became available in 1958 supported a rapid growth of schools and students during the 1960s.

Most schools of public health have emerged either from, or in, close connection with schools of medicine. Almost all of the schools of public health are located in medical or health centers—18 associated with medical schools, 15 with nursing schools, and 14 with dental schools. Thirteen of the schools are in centers with all four schools (public health, medicine, nursing, and dentistry), and several of these also have schools of pharmacy or allied health professions.

The physical proximity of the schools of public health and medicine is shown by the fact that the distance between the offices of the deans is 500 feet or less in 13 of the situations and no more than 0.5 mile in all the others. Physical proximity, of course, indicates the potential for close working relationships, not necessarily their attainment.

Half of the medical schools located on campuses with schools of public health maintain separate (or joint) departments of preventive medicine, but in some of these situations serious consideration is now being given to turning over to schools of public health the preventive medicine responsibilities in medical schools. In the other half of the situations reported this has already been done.

In practically all of the 18 centers where schools of public health and medicine coexist there are crossover appointments between the schools, and in most cases these involve three or more medical school departments. In all 18 situations, faculty of the medical school teach in the school of public health, and, in all except two, faculty of the school of public health teach in the medical school. While in several cases the participation of one faculty in teaching students in the other school seems quite substantial, in about half it is clearly only slight.

About half of the schools of public health report arrangements to earn the M.P.H. and M.D. in joint degree programs, covering only 4 years (one within 3 years), but such arrangements are actually used to a minimal extent. Comments on the questionnaire indicated that such arrangements are receiving more attention currently than in the past.

In most schools of public health and medicine located on the same campus, faculty of the two schools collaborate in research and community service projects. These involve a wide range of activities and in about half, the situations appear to be quite substantial endeavors.

Among the 19 schools of public health, 2 are essentially components of medical schools and another is located on a campus where there is no medical school. All 16 of the remaining schools have the same status in their academic hierarchy as the medical schools, usually participating on a coequal basis in a council of deans with the other schools of the health professions, or reporting directly to the president or a vice-president of the university. In some cases there were indications of considerable and cordial administrative collaboration between the schools on a campus; in others, the council of deans or other coordinating mechanism appeared generally to function on a low key and sometimes with evidence of coolness.

The flavor of responses from schools of public health to item 17 of the questionnaire, concerning present relationships to departments of preventive medicine, is indicated in the following extracts:

> *The School evolved from the former Department of Preventive Medicine, in the School of Medicine . . . (it) still serves as a preventive medicine department, but the relationship is not formalized.*
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> . . .
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> *Relationships have fluctuated tremendously . . . Relationships at present leave much to be desired.*
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> . . .
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> *Both schools are very new . . . Relationship is very cordial and cooperative.*
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> . . .
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> *The relationship between the two schools has been close from the outset . . . ties were maintained and strengthened by joint development of community services. No major difficulties have yet been encountered.*
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> . . .
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> *The School has always valued the relatively close association with the Medical School, however, and, indeed, we find very little difficulty in developing collaborative projects with the faculty . . . we enjoy good working relations with the administrative structure and our ability to do more is limited now by our own lack of resources rather than administrative obstructions to collaboration or change.*
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> . . .
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> *No difficulties . . . Current sentiment suggests that the School of Medicine will request the School of Public Health to do all teaching of public health and preventive medicine for the School of Medicine.*
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> . . .
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> *It is the intent of the Dean of the School of Public Health to recruit faculty so that all major departments in basic science and clinical areas will have at least one fully credentialed faculty member jointly appointed and salaried with the School of Public Health. Gradually, all teaching, service, and research functions of the Department of Preventive Medicine and School of Public Health will be consolidated and the disease prevention, health promotion and environmental protection curriculum will be taught by the jointly appointed School of Public Health faculty. As an interim, the Deans of Medicine and School of Public Health have designated one jointly appointed faculty member to be responsible for curriculum planning and course scheduling between the two programs.*
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> . . .
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> *The School of Public Health and the School of Medicine were established at approximately the same time. . . . In their initial stages of their development, it is fair to state that there was a feeling of friendly competition. Since the assumption of the medical school deanship by the current Dean, the relationship between the Schools has become increasingly productive and at the present time is probably as close as any two schools on the campus with similar interests.*
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> . . .
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> *. . . there have been few difficulties between the Schools, but neither has there been much value in the relationship, in spite of close geographic proximity. A major factor in the lack of relationships has been the personal attitudes of the deans and certain department chairmen. This is not to say that mutually beneficial arrangements, involving both teaching and research, have not evolved between faculty members of the two Schools; they have, but undoubtedly there*

would have been more in a more favorable climate.

. . .

The School of Public Health and the School of Medicine are physically adjacent in the Center for the Health Sciences. This facilitates intercourse and sharing of facilities. Several of the School of Public Health faculty have joint appointments in one or more departments of the School of Medicine. The Division of Epidemiology (SPH) is composed of faculty from both schools, and gives courses in both schools. Relations between the schools have always been cooperative and cordial, except in competition for building space.

. . .

There are many strong and healthy research relationships. . . . There is a close historical tie between the two Schools. . . . The dissolution of the Department of Preventive Medicine of the School of Medicine . . . has led to a spotty and unfortunate history as regards the formal teaching of epidemiology, biostatistics and public health in the Medical School. The original plan was for the School . . . to serve instead of a Department of Preventive Medicine. However, the lack of any single senior individual responsible primarily for teaching medical students, and the absence of any voice in the Medical School led to a gradual reduction in the number of hours available for formal teaching and eventually to the complete disappearance from the course requirements for medical students of any courses in Biostatistics, Epidemiology, Preventive Medicine or Public Health. . . . The responsibility for teaching 'Preventive Medicine' to the students rests with the individual Medical School Department Chairmen.

. . .

. . . when the School of Medicine was started the decision was that the Department of Preventive Medicine and Public Health of the School of Medicine would offer the graduate courses in public health. The rapid growth of the School of Public Health during the past 10 years led us to obtain our autonomy for more flexible functioning . . . we became separated from the School of Medicine but with certain conditions:

(a) School of Public Health would be the Department of Preventive Medicine and Public Health of the School of Medicine.

. . .

The relationship of the two schools may be characterized as being closer in philosophy and in mutual recognition of interdependencies than at any point in prior history. This has evolved as the School of Medicine has slowly begun to develop from the traditional posture of medical education, with its emphasis on disease and clinical medicine, to a new discovery of the family, the community, and a responsibility for health care of populations. The School of Public Health has broodened its philosophy to include not only health promotion and disease prevention but a concern with all of the forces, biological, social and otherwise, which influence health. These two factors have led naturally to close collaboration. Unless the trend is interrupted by a change of leadership on other factors, this trend should continue.

. . .

During the . . . years that I have been here, we have experienced a variety of relationships between this School and the School of Medicine, some of which have been mutually beneficial. . . . close working arrangements exist between our Departments. . . . On the other hand, relations between the Department of . . . in the Medical School and our Department of . . . have been generally at arms-length partly because of local historical reasons. I detect also a general coolness on the part of the Dean of the Medical School . . . because of his general belief that anything we can do, he can do better. Although we work together as needed, I don't feel that our relationship is as effective as would be desirable.

. . .

In the . . . years in which the two schools have been separate entities, relationships have been excellent. Each school permits students to take electives in the other school. The development of the combined M.D.-M.P.H. and M.D.-M.S. Hygiene programs has strengthened relationships between the two schools. Joint committee appointments . . . on curriculum and executive committees . . . are useful. There have been a few problems related to financial reimbursement of the two schools for various curricular responsibilities. Occasionally problems of curriculum con-

tent have developed but these have not been difficult to solve. There are a few departments of the Medical School that do not permit joint appointments. This should be changed.

Although a Department of the Medical School, there have been some difficulties of isolation. Currently a movement towards stronger relationships, through:

- *joint planning in relation to medical center activities*
- *joint degree programs*
- *joint teaching*
- *joint research*
- *joint service projects.*

The principal ideas from schools of public health on the ideal relationship with schools of medicine (item 18 on the questionnaire) are given below:

> *If universities had no schools of public health, they would have to invent something like one. Whether they located such a unit within a medical school (as a department of community medicine or some such name) or elsewhere should depend on how effectively the unit could develop interfaces with other parts of the university (e.g. economics, political science, law, etc.) as well as with the medical school. My vote would be for administrative independence of the unit but with strong incentives from the central administration to assure close cooperation among the respective deans in developing joint academic programs, joint appointments, and other forms of cooperation . . . I think the deans of the medical school and school of public health must share objectives in the teaching of medical students and in the development of community health services as vehicles for teaching and research. In this way they can bring together the resources of two institutions toward common goals. The two institutions can and should differ substantially in their other functions.*

. . .

> *. . . schools of medicine and schools of public health should be located on general university campuses. I believe that the relationship between such professional schools should be close and cooperative. . . . the teaching of preventive medicine and community health as well as epidemiology and biostatistics should fundamentally take place in the school of public health. . . . the basic sciences are probably as well taught in university departments as in the schools of medicine. They may, indeed, be better taught in such loci . . . medical schools are primarily oriented, and should continue so, toward the training of practitioners of medicine. Schools of public health on the other hand should devote themselves to the training of practitioners and leaders in community health and the delivery of services, both health and medical.*
>
> *I also strongly believe that we need more problem-centered training in both our medical and schools of public health. If and when such activities are developed on a general campus, it will be found that a great many professional and nonprofessional schools will contribute more effectively to the solutions.*

. . .

> *I believe it . . . is very important that the School be in a strong position to serve as the Department of Preventive and/or Social Medicine for the Medical School in the '70's. Whether or not we can find the resources to do that remains a question. We do have unique concepts to offer, however, and believe we should make every attempt to function in that capacity. If we do not, social pressures will cause schools of medicine to provide these functions for themselves and schools of public health may well end up as part of the allied health professions.*

. . .

> *Relationships between the schools are dependent . . . on the mutual respect of the faculty at every level. . . . This cooperative spirit can be fostered by . . . instrumentalities for cooperative research, teaching and service. . . .*
>
> *The establishment of joint academic programs (i.e., M.D., M.P.H.) joint educational endeavors i.e., decentralized educational centers for continuing education and the maintenance of a cordial spirit between the school deans is more important in effectuating positive action than any pattern of organizational structure.*

. . .

> *In the 70's medical students should get more exposure to social medicine. This can be achieved through a sharing of School of Public Health faculty with the School of Medicine.*

. . .

The schools of public health must remain autonomous graduate schools capable of affording opportunities for advanced training at the master's and doctoral level of all the various professional and paraprofessional groups comprising the health industry. The schools represent the single group of institutions which afford opportunities for true interdisciplinary collaboration of "peer groups." The schools of medicine must and should give priority to their own profession and should have faculties whose primary interest and expertise lie with the training of medical students and physicians. Schools of public health, or the other hand, should attract faculties whose interests, inclinations and expertise allow them to deal with a much wider range of individuals coming from more varied backgrounds and covering the entire gamut of the health professional field.

Schools of medicine should have their own separate departments of preventive medicine which ensure that medical students are well grounded in the epidemiologic principles and methods which underlie sound preventive medicine programs. There should be ample course offerings available to medical students to allow them elective opportunities in some of the "administrative medicine" specialty areas and these could be offered by schools of public health for medical students in their own universities as well as for students in other neighboring universities. However, the physician must be equipped to deal with the clinical aspects of medicine—regardless of his later specialization interests or his actual area of practice in later life. Therefore the primary concern of the medical school should be with the training of physicians *concerned with the care of the patient. The primary concern of the school of public health should be with the training of* all health professionals, *including physicians, in the specialized problems of population and community health.*

. . .

. . . where Schools of public health exist, I would not favor the existence of a separate department of preventive medicine and public health. This dual existence leads to isolation. The faculty of the schools of public health must realize and internalize the importance to themselves of being an integral part of the school of medicine. . . . Service activities should be in consortium with the other professional schools rather than individualistic (same for research).

. . .

In my opinion, schools of public health are unique institutions for which there is no substitute. Their missions are directed at the study and solution of community problems and their students are prepared for this purpose. Departments of community medicine, in my experience, are primarily concerned with the preparation of physicians to deal with personal health problems in an organized fashion, but they do not pretend to train their students either to be specialists in the scientific fields that underlie public health nor to be managers of major public and private enterprises.

Accepting these points to be factual, I cannot but conclude that it would be a mistake to blanket schools of public health into medical schools. At the same time, I firmly believe that there must be the closest possible relationship established between the two schools, and particularly with departments having similar interests (e.g., medicine, radiology, psychiatry, community medicine), when they exist on the same campus.

. . .

—Relationships depend on people as much as administrative structure

—The ideal relationship would not be limited to public health-medical school, but would include all health sciences, as equal *partners.*

—The ideal relationship would be a collaborative one in teaching, research and service.

. . .

. . . A joint committee of the Medical School and the School of Public Health should meet regularly relative to teaching of medical students by faculty of the School of Public Health. This committee might also serve as a joint committee for the combined M.D.–M.P.H. program. It would be helpful if a member of the Medical School faculty sat on the Executive Committee of the School of Public Health in an ex officio capacity (non-voting), and a member of the School of Public Health faculty, continued to serve on the Medical School Executive Faculty as an ex officio member. . . . Joint departmental appointments are desirable where there is interest in collaboration in teaching or research. Some

representation of each school on the curriculum committee of the other school is desirable. A separate administrative and financial structure for the two schools has proved to be most useful.

MEDICAL SCHOOLS

Among the medical school departments responding to the questionnaire about half reported a combination name, such as Public Health and Epidemiology, Preventive Medicine and Community Health, Family and Community Medicine, and the like. The flavor of the department names may be seen in the number of times that certain words appeared:

Medicine	73
Community	51
Preventive	38
Health	31
Family	9
Epidemiology	8
Social	5

While several of the departments of preventive medicine indicated that they carried responsibility for teaching the newly emerging specialty of family practice in their schools (more than nine indicated by the term in their title), the dominant pattern seems to be for separate departments for this field. Thirty-two of the reporting schools (about one-third) have already established independent departments of family practice (including a few sections in departments of medicine), and another 28 are reported to be considering doing so. It is worthy of note that only five of the departments indicated that consideration was now being given to establishing schools of public health where these do not presently exist.

In contrast to the extensive commitment of schools of public health to awarding graduate degrees, the departments of preventive medicine are only minimally involved in degree-oriented graduate education. Only 14 of the medical school departments reported awarding such degrees during 1972 and 2 others mentioned degrees awarded by arrangement with other departments; 6 awarded only one or two graduate degrees during the year and just 1 school awarded more than 10.

In addition to physicians almost all the departments of preventive medicine include on their faculties a biostatistician, usually full time, but in a few instances the medical schools maintain separate departments for this discipline. A large majority of preventive medicine faculties also include someone in behavioral science, and most in social work. Only a few mentioned faculty members in environmental health. A wide variety of other disciplines were represented. There is great variation in the size of departments of preventive medicine, from a very few part-time faculty to large departments with full-time faculty in many fields.

Almost all the departments reported being engaged in some community health service activities, about half of these quite extensively. In some cases this kind of endeavor obviously involves a large proportion of faculty effort. While several departments mentioned local health department activities, more commonly the departments reported being engaged in the new forms of ambulatory care being established in communities, such as, neighborhood health centers, drug abuse clinics, and the like.

The item in the questionnaire calling for the views of preventive medicine department chairmen on how training for public health should be conducted, and particularly the role of departments of preventive medicine, brought a substantial response. Most prevalent was the idea that departments of preventive medicine should teach medical students the basic elements of preventive medicine (several mentioned epidemiology specifically) and orient students to public health, leaving graduate preparation for professional careers in public health to schools of public health. Many mentioned residency training in preventive medicine particularly, to prepare physicians to assume managerial responsibilities in new forms of health care delivery. Several emphasized collaboration with schools of public health—present, planned, or potential—in the graduate education of physicians. A small number asserted that departments of preventive medicine could offer training equivalent to that available in schools of public health.

To give a more direct flavor of the responses the following extracts may be cited:

> *We prepare physicians who wish to retain clinical responsibilities and activities but who wish to be able to allocate health care resources appropriately for established needs of a defined population. We envision such physicians to be*

clinic or HMO medical directors. We advise postgraduate clinical experience in medicine and/or pediatrics; some formal coursework in medical care planning, evaluation, organization; experience in same.

. . .

The most urgent need in public health is broadly trained and experienced managers, both physician and non-physician. Those departments of preventive medicine currently engaged in planning and organizing new delivery systems for their medical centers are an obvious resource for such training and should move increasingly toward offering graduate training in the techniques required to manage large scale health care systems. The basic sciences (biostatistics, epidemiology, management science, accounting, systems analysis, etc.) are already generally available. The practical experience is being accumulated, and I believe our departments have an obligation to move this activity as quickly as possible.

. . .

The possibility of expanding some of our departments into complete schools of public health (on the University of Washington model) should be seriously considered, as should the development of more programs on the 'clinical scholars' model.

. . .

I see graduate training for public health as mainly but not solely the function of schools of public health, both at masters and doctoral levels. Others contribute—medical schools and other units of the university. Clearly, some medical school departments of preventive medicine should be encouraged and permitted by public health program accreditation agencies, together with assistance from federal funding sources, to develop graduate degree programs in public health commensurate with their abilities, resources and opportunities.

. . .

. . . the schools of public health at UCLA, University of Washington, Puerto Rico, Oklahoma, etc. all evolved out of relatively strong departments of preventive medicine and it is important that this model for SPH development be recognized and sustained. New 'instant' schools of public health like Pittsburgh are apt to be rare. Further, while only about 20 per cent of the states have schools of public health, most of the states have schools of medicine. It seems especially incumbent on schools in such states to exercise leadership in public health, through their departments of preventive medicine, and this may include warrant for the provision of public health training.

. . .

. . . medical school departments of preventive medicine have not considered enough their capacity to offer Ph.D. or other doctoral degrees such as Doctor of Medical Science in a public health specialty.

. . .

. . . other units of universities (public administration, business administration, engineering, economics, behavioral science, etc.) have the capability of associating their programs with schools of medicine for training for certain public health specialties. Should this be encouraged?

. . .

The chief advantage of the medical school department of preventive medicine as compared to schools of public health is the intimate contact with clinical disciplines involved in clinical care. These fields also provide the model of learning by doing under supervision. I see the medical school departments of preventive medicine playing a special role in training health care managers and evaluators because of this close and often direct involvement in health care delivery.

. . .

I see diminishing role in the field of environmental health in medical schools, but believe schools of public health should develop intimate contacts with public health delivery systems where the graduate student continues a close preceptorship relationship to the school of public health during his field work. Optimally there would be no sharp demarcation between the period in the school of public health and in the public health practicum.

. . .

There will continue to be for some time, of course, a need for workers in traditional public health fields but ultimately I believe that the schools of public health are going to have to convert themselves into some sort of direct *service-rendering organization in order to provide pertinent training.*

. . .

Medical school departments have a responsibility to orient medical students to the principles of public health and disease control and to acquaint them with how people function in various types of aggregates, about the societal context, and the roles of health personnel in service systems. Through the activities of the department a proportion of students should be recruited into the health field as professional public health physicians. These students should be given special opportunities through electives to learn about the role and have an opportunity to try it out to some extent in various real-life field situations.

. . .

To me—'public health' means an intervention, action-oriented program for enhancement of the health of the population. I do not believe that this can be realistically or effectively taught in any setting other than one in which this activity is being carried out.

For this reason, a medical school environment (as now constituted) is a better site for 'public health' training. Current public health school environments do a beautiful job of training analysts, biostatisticians, and other methodologists—which are badly needed talents—but are not engaged in 'public health.'

. . .

Medical school should provide basic input for all physicians regardless of specialty career choice. School of public health should be truly post-graduate for those desiring a career in preventive medicine (as defined by boards). Alternative input within medical school departments should also be acceptable for post-graduate training.

. . .

At present most of these departments, including our own, do not have the scope and numbers of faculty required for effective training for public health. Training for public health is best done in schools of public health and in community health agencies.

. . .

Believe training in strong departments of preventive medicine should be considered equivalent to that in schools of public health.

. . .

5

The trend in recent years toward academic health centers versus *medical centers—in name at least—bespeaks an increasing emphasis upon maintenance and promotion of health. In our department, as with numerous other medical schools, an effort in family practice or primary care is growing because of public pressure and professional recognition. For undergraduate medical training, a department of preventive medicine is still vital in medical school. Residency training in preventive medicine should also be a feature of this effort if the department is strong enough to support advanced students. An academic school of public health can exert a leavening influence in the university by merging with medical school activities or programs. The growth of schools of allied health professions is another realm in which medical and public health schools are promoting the recent concept of academic health centers.*

. . .

Training for traditional public health activities should be given in schools of public health.

Schools of medicine can give unique training opportunities to future academic teachers of preventive medicine, planners and managers of health care delivery programs, and joint training in preventive medicine and another clinical specialty.

. . .

Departments of community medicine that have sufficient resources (and this is a must) should develop strong residency programs in community medicine. Where possible for example, geographically, liaison of such programs should be explored with schools of public health, particularly where depth of specialization may be important in an individual candidate's training. For example, one year of a three-year program might be obtained at a school of public health (MPH equivalent year). The medical school could better support the clinical, field research, and teacher training aspects of residency programs.

. . .

Modern medical school curricula leave little room for teaching public health. In depth instruction in this discipline must necessarily be done in schools of public health where sanitary engineers, biostatisticians, public health administrators, social workers, epidemiologists and public health nurses are available to give a complete program of instruction.

Medical students, on the other hand, should all be taught the elements of prevention. While there is considerable overlapping between preventive medicine and public health, the two are definitely not the same.

. . .

I expect that within the next 5 years the developing departments of Social and/or Community Medicine in our medical schools will have to play a key role with probably a selective complementarity [sic] between themselves and with schools of public health in Toronto or in the U.S.A.

Undoubtedly a very careful exchange and discussion of ideas between interested educators facing such a possible integrated future approach and those in the traditional public health schools is essential.

. . .

. . . a synergistic program might be conceived whereby the laboratory, or practical, or clinical component in the training for public health could be developed by the department of community medicine in conjunction with a neighboring school of public health.

. . .

In summary, my experiences lead me to the belief that the multiple types of instructional programs and the variety of faculty which need to be brought together for a successful school of public health do not fit easily into the organization of a medical school. The close association of medical faculty and public health faculty is highly desirable and their association may provide an excellent basis for incorporating other health schools into group activity to train students more effectively for the health programs of the future.

. . .

Although I could go on at considerable length, I would tend to formulate the relationships briefly as follows: It seems to me that the department of preventive and social medicine should be retained as an entity in the medical school with a relatively moderate size faculty. It should, if you will pardon the expression, serve an advocacy role in the school of public health to mobilize appropriate resources for the teaching of medical students and also to recruit medical students for work in the various departments of the school of public health and also to work for degrees in public health.

I went through a period of wondering whether there was a genuine reason for the Department to continue to exist. I have come to feel rather strongly that if it did not, the interests of the medical students might be lost in the demands which faculty members of the School of Public Health inevitably have placed upon them. To be sure, all of this assumes that the departments in the School of Public Health would be provided with staffing patterns which take into account responsibilities for medical student teaching and research opportunities.

. . .

Medical School departments (preventive medicine, public health and/or community medicine) should have in depth education in behavioral science and quantitative methods (epidemiology, biostatistics, and the decision process) as well as the more traditional preventive medicine and public health content. In addition, student exposure at the community level with the delivery system is essential. Concurrent inter-relationship with a school of public health would be ideal during this process and combined degree programs possible and encouraged.

. . .

Unless 'Public Health' undergoes a change in definition, I do not see a regular role for departments of preventive medicine in medical schools in such training. There will always be special circumstances and students who could be involved in medical school departments of preventive medicine, but I doubt that this would be for degree purposes. In general, I think that schools of public health have quite another responsibility and need which are not realizable in schools of medicine. This in no way should be inferred as meaning that there cannot be cooperative effort both in research and training between the schools of medicine and schools of public health. There are certainly many places where this could be done; for example, some students in a school of public health might desire some clinical experiences which could be arranged through schools of medicine. The same would hold for epidemiological investigations involving clinical situations, etc.

. . .

The role of medical school departments of preventive medicine and community medicine should be to introduce medical students to this holistic method of viewing ill health, and to respond to and encourage individual students' potential interest in this area of medicine—that is, treating populations of people, rather than individual disease entities. Presently, we feel our responsibility is to teach our students that ill health occurs as a community problem, that it is influenced by social, psychological, and political, as well as organic factors. We also focus on economic factors influencing the availability of quality medical care, and involve our staff and students in the planning and implementing of health care services to underserved populations.

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QUESTIONNAIRE ON RELATIONSHIP OF
SCHOOLS OF PUBLIC HEALTH TO
SCHOOLS OF MEDICINE

1. Name of School of Public Health ______________________________
____
2. Date of its establishment ______________________________
3. Number of graduate students, 1971-1972 ______________________________
4. Number of graduate degrees awarded, 1971-1972 ______________________________
5. Does parent University also have a medical school? Yes______ No______
6. If no, skip to item 18.
If yes, please complete items 7-18.
7. What other health professional schools does the University include?
Dental Yes______ No______
Nursing Yes______ No______
Pharmacy Yes______ No______
Other, ______________________________
specify ______________________________
8. What is the approximate physical distance between the offices of the Dean of the School of Public Health and the Dean of the Medical School?
(feet or miles) ______________________________
9. Does the School of Medicine have, apart from the School of Public Health, a Department specifically concerned with Preventive or Community Medicine? Yes______ No______
If yes, name of Department ______________________________
10. Do members of the faculty of the School of Public Health have joint appointments in the School of Medicine?
Yes______ No______
If yes, specify the departments in the School of Medicine in which such joint appointments are held ______________
____
10a. Do members of the faculty of the School of Medicine have joint appointments in the School of Public Health?
Yes______ No______
If yes, specify the departments in which such appointments are held in the School of Public Health ______________
____
11. What required courses? (specify) ______________________________
______________ ______________
______________ ______________
What elective courses? (specify) ______________ ______________
______________ ______________
______________ ______________
12. Do the Schools of Medicine and Public Health offer joint degrees, e.g. M.D. and M.P.H.? Yes______ No______
12a. Do you have any special arrangement now for medical students to take the whole M.P.H. course as an elective?
Yes______ No______
12b. If yes, can they receive credit towards the M.P.H. during the same period of time they are earning their M.D. degrees? Yes______ No______
12c. What is the shortest period of time (years) necessary for a medical student to earn both degrees (M.D. and M.P.H.)? Years______________
12d. Do you offer such students P.H.S. Traineeships? Yes______ No______
13. To what extent do faculty members of the School of Medicine participate in the curriculum of the School of Public Health? (Describe briefly.)
14. List titles of major research projects in which faculty members of School of Public Health and School of Medicine are now collaborating.
15. List major community service projects initiated by the University in which faculty members of the School of Public Health and the School of Medicine are now collaborating.
16. Describe briefly administrative relationships between the School of Public Health and the School of Medicine, e.g. Council of Health Science Deans, joint planning enterprises, etc.
17. Summarize the relationship between the School of Public Health and the School of Medicine in your University with attention to the history, values and difficulties in the relationship, as well as its nature and extent.
18. Summarize your views on the ideal relationship between schools of public health and schools of medicine for the 1970's.

QUESTIONNAIRE ON RELATIONSHIP OF MEDICAL SCHOOL DEPARTMENTS OF PREVENTIVE MEDICINE TO ACADEMIC TRAINING FOR PUBLIC HEALTH

1. Name of Medical School ____________________
2. Name of Department (Preventive Medicine, Community Medicine, or other) ____________________
3. Does Medical School have a separate Department of Family Medicine? Yes____ No____ If not, is consideration being given to establishing one? Yes____ No____
4. Number and type of graduate degrees awarded in Department of Preventive Medicine, 1971–1972 ____________________
5. Does parent University also have a School of Public Health? Yes____ No____
   If not, is consideration being given to establishing one? Yes____ No____
6. Besides medicine, what other disciplines are represented by one or more persons on Department of Preventive Medicine faculty:

	Full-time		Part-time	
	Yes	No	Yes	No
Biostatistics				
Behav. Science				
Social Work				
Other (Specify)				

7. List major community health service projects in which Department is engaged: ____________________
8. Summarize your views on how training for public health should be carried out, especially on the present and potential role of medical school departments of preventive medicine in such training: ____________________

DISCUSSION

Maureen M. Henderson

Dr. Breslow has described examples of academic relationships between schools of public health and schools of medicine in the United States and Canada during the past 30 years. He carefully pointed out that our schools of public health were founded at varying points of time. To some extent then, the initial and subsequent formal and informal relationships with medical schools were to be molded by time-related circumstances, including varying sources of fiscal support, student population, and prevailing approaches to disease control. The last should be given serious consideration as a determinant of the content and format of educational programs in both health and medical schools.

A simplistic summary of changes in the approach to disease control over time is shown in Table 1. Distinction at the level of program activity is crucial to perceiving the appropriateness of medical school or school of public health as the preferential site of training. It should be emphasized that this sequence of approaches to control is applied to one set of disease problems after the other. Technical training of practitioners to maintain environmental control of "older" diseases continues unabated. This discussion is restricted to the training of future physicians for their contemporary role in disease prevention and control.

TABLE 1.

Control of	Level of Program Activity
Infections by Environmental Measures	community
Infectious Disease by Immunization	1. community 2. individual
Chronic Disease by Therapeutic Intervention	individual
Chronic Disease by Risk Factor Intervention	1. individual 2. community
Chronic Disease by Environmental Measures	community

Our first public health schools were founded at a time when there was a general emphasis on control of infections by environmental measures, followed by a phase in which the control of infectious disease by immunization and similar procedures represented the new emphasis. These procedures were first applied at a community level and later at an individual level through personal physicians. First attempts to counteract the effects of chronic diseases focused on therapeutic intervention and its corollaries, those of early detection of disease and a comprehensive approach to individual patient management. Current practice emphasizes efforts at control of the anticipated effects of chronic diseases by alteration of risk factors. Introductory programs have been focused at the individual patient level, but I predict they will gradually broaden into community level application and then into a period of concentration on control of the effects of chronic diseases through the application of environmental measures.

Whether or not there is general agreement about these summarized secular trends they at least illustrate the point that it is easy to identify relative advantages to training in one or the other type of institution in line with change in the content and practice of public health measures.

Dr. Berg has described changes in medical school departments of preventive medicine over time (*1*). It is particularly important to note that these departments have an ability to change programs to meet training need. This ability is, in great measure, the result of their homogeneous student population and their historical lack of commitment to formalized degree-awarding graduate programs. It is unlikely that schools of public health, with a different student population and more formalized degree-awarding programs, could ever achieve the same potential for rapid response. If joint training programs are conceived, it would be important to exploit this characteristic of departments of preventive medicine to mutual advantage.

Events in other countries, whether introducing innovations in existing organized health care services or developing entirely new services, can be drawn upon to predict patterns of change in this country. A selected review of the experience of other countries suggests that we in the United

States will be faced with increasing pressure to make efficient use of health professional educational resources and institutions, and to provide training programs which will allow students both to learn and to develop new role models. Both pressures can be met by an educational system that identifies levels of scientific education and levels of training in specific skills, and is prepared to offer education and training at appropriate levels to all students who need to reach that level, whatever their final career goal.

Schools of public health are nearer to this type of education than other health professional schools and should be in a position to give leadership to other schools if the predicted pressures materialize. It is interesting to note that this approach to professional health education and training requires objectives of undergraduate medical student education similar to those adopted in the United Kingdom. In that country, they have agreed that medical school education is to provide "all that is appropriate to the understanding of medicine as an evolving science and art to provide a basis for future vocational training. It is not to train doctors to be biochemists, surgeons, general practitioners or any other kind of specialist; the fundamental requirement is that basic medical education should give the student knowledge of the sciences upon which medicine is based and an understanding of the scientific method." (*2*).

The current trend in medical school education in this country is in a different direction, namely, an increasing tendency to track or systematize groups of students—a format that encourages early specialization. If continued, these trends will likely lead to an earlier or possibly premature separation of medical students into groups directed towards basic science, clinical, and community health practice. In sum, this disparity between evolving patterns of education and training in medical and other professional schools and in schools of public health should be given consideration in relation to future needs and the possible development of joint programs.

Currently, there is world-wide interest in the development of efficient, integrated health care delivery programs and equal emphasis on the development of program management skills. The British Department of Health and Social Security has published a report of its Working Party on Administrators (*3*), in which the case is made for including physicians trained in the specialty of community medicine as executives and managers within the newly organized and unified national service. This new role is distinguished from the role of advisor and teacher in community medicine, and in my view its introduction will increase national needs for the latter. In the published program of work for 1973 to 1977 (*4*), the Director General of the World Health Organization (WHO) has stated that "increasing government involvement in the control of health services will dictate the necessity of preparing suitably qualified and experienced health managers capable of forming links between the technical components of the health service and the administrative and legislative components of government." These and other statements reflect a consensus that high quality program management and evaluation are fundamental to comprehensive health service program development, that a certain proportion of administrators at all levels must be physicians, and that community medicine training is the best medical specialty training for this group of administrators.

The British advocate a 3- to 4- year post-graduate specialty training program which includes supervised in-service experience in a variety of operational circumstances. Their training programs will be cooperative ventures between academic and professional bodies and health service authorities. Apprenticeship training is to be complemented by formal academic education in the sciences basic to the practice of disease prevention and control. The sciences will include those basic to management and to the implementation of social organization. The World Health Organization will pay more attention to providing training services in both administration and management of health services and will emphasize modern scientific and technical methods of management adapted to local conditions.

Dr. Breslow's analysis of the results of his survey notes that several medical school departments already have specified interest in training both physician and nonphysician health-care managers. These departments tend to emphasize the need for available ongoing service programs in which apprenticeship training can be pursued. Some schools of public health have described long-standing training programs which use health departments for in-service experience. A recent recruit to the field of formal specialty training in general preventive medicine is the Center for Disease Control in Atlanta, Georgia, and its wide-spread service programs have become available as vehicles for this form of in-service training. Schools of public health and training programs run by public health authorities have hardly begun to emphasize and specify the content of training for managers.

An obvious but perhaps over-simple suggestion is that these particular careers provide a unique opportunity for the specification of collaborative training programs which would make maximum use of the academic and broad disciplinary resources of schools of public health and the clinical programs belonging to, or available to, departments of preventive medicine. Very tentative and early steps have been taken toward this type of joint training within the context of contract-supported, large-scale, population-based studies. These studies serve to build new, if narrow, bridges between medical service operations, usually in medical schools, and a limited number of departments within schools of public health. Research of this type is likely to increase if more stringent public questions are asked about effect and efficiency of both medical and health care services and programs. This is another area where existing relationships should be considered for exploitation to further the development of training programs.

A second trend in professional education in this country is toward a reduction in duration of the educational process accompanied by an increase in technical training. The result is disproportionate reduction in scientific education in medical school, a direction likely to require, in the long run, additional compensatory basic science education in most residency training programs. In its requirement of postdoctoral academic training in its basic sciences, general preventive medicine is ahead of other clinical specialties and has a unique opportunity to provide leadership in the format of specialty medical training.

This is an appropriate time for the leaders in public health and general preventive medicine to review their total teaching resources and aim to utilize them in so efficient a way as to favor the introduction of innovative, contemporary training programs. While recommending the development of truly collaborative training programs, I must stress the urgent need of wide recognition of the exceptionally important and unique responsibilities and mission of the two sets of institutions. Undergraduate health professional students must be prepared for the future. Exchanges with countries with health services in more advanced stages of organization than our own suggest that past deficiencies in the professional health schools' curriculum must be anticipated and compensated for by pervasive and high quality education in the principles and applications of community health sciences. For a number of years, therefore, medical school departments of preventive medicine must educate both faculty and students in these sciences and must serve as the initial source of recruitment. Schools of public health must provide advanced training in practice and in research methods and must implement research which will expand both the knowledge and the horizon of the field.

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4

VISIONARY AND REVISIONIST VIEWS OF SCHOOLS OF PUBLIC HEALTH

Reuel A. Stallones

The origins of formal education in community health in the United States have been traced a number of times. The accounts do not always agree, but the discrepancies likely can be accounted for by differences in definitions and in the institutions from which the authors received their own degrees. Sometime in the 1910s, graduate education in community health was begun, and there was a formal designation of schools of public health in the 1920s. The development came out of the sanitary/bacteriological revolution of the 19th century, and, despite the prophetic adjurations of some, the earliest educational programs in the schools were devoted very largely to medical microbiology and the control of communicable diseases.

From this a pattern for schools of public health emerged; they were organized into departments that carried disciplinary identification, specifically epidemiology, biostatistics, environmental health, and administrative methods. As new programs emerged or grew in importance, they were likely to be declared to be disciplines and, in some schools, added to the structure as new departments.

Although curricula were reviewed and modified frequently, organizational forms changed very little. The result was a progressive fractionation and divergence of the factions; the schools were held together by a core curriculum, comprised of separate courses or a more or less integrated program of instruction. The core curriculum reflected allegiance to the origins of public health with emphasis on epidemiology, biostatistics, environmental health, and administration, altered only by the addition of some behavioral science in some of the schools. The rigidity of this pattern was promoted by the edicts of the accrediting agency, the Committee on Professional Education of the American Public Health Association.

By about 1955, some muttering complaints were heard concerning the core curriculum; this was due, at least partly, to the desires of the splintered specialty groups for more time in the sun for their students. In the 1960s substantial variations were introduced, usually in the directions of increasing the elective hours at the expense of core courses. Opinions surely vary, but this can be considered to have further decreased the likelihood that community health would be viewed as an area worthy of study for its own sake.

The central issue in education for community health is whether community health (or public health) represents conceptually something more integrated than the separate activities of a number of professions. That schools award master's and doctoral degrees does not answer the question, because the degrees are umbrellas covering extraordinary diversity. Usually our notions of what constitutes academic discipline are determined by ideas derived from science, wherever greater specialization and narrowing have differentiated and defined the fields, and little prestige accrues to those who try to understand the intersections and interrelations between fields. Community health can hardly be defined as other than the coalescence of activities of people from many fields concerned with health and illness within human communities. *Therefore, the discipline of community health must consist of the linkages between these interests and the rationale and purpose for assembling them.* Although the mix of professions has changed as the problems addressed have changed, this definition of community health is relatively stable.

These concepts are material to an understanding of relations between schools of public health and departments of preventive medicine, and of alternate ways in which education in community health might be accomplished within a university. Among the possible models are:

1. A free-standing school of public health on a campus with or without a medical school.
2. An academic consortium on a general campus with or without a medical school.
3. A consortium of health professions in a health science center.

Nevertheless, while all of the schools of public health in the United States share campuses with schools of medicine, some of them are not on general campuses. Presumably, the pattern is the result of a view more commonly held earlier that public health was a subspecialty of medicine. Al-

FUNCTIONAL DISTRIBUTION OF ACTIVITIES RELATED TO THE HEALTH AND DISEASE OF MEMBERS OF A COMMUNITY	
COMMUNITY HEALTH AND MEDICAL SERVICES [ONE PRACTITIONER:MANY CLIENTS]	PERSONAL MEDICAL SERVICES [ONE PRACTITIONER:ONE CLIENT]
INFORMATION SYSTEMS RESEARCH MONITORING/SURVEILLANCE EVALUATION/INTERPRETATION DISSEMINATION	
COMMUNITY HEALTH ENVIRONMENTAL MANAGEMENT	
COMMUNITY MEDICINE MANPOWER FACILITIES ECONOMICS QUALITY ORGANIZATION	

though several schools of public health developed from departments of preventive medicine, and several schools serve as the departments for their sister medical schools, only one department now functions as an accredited school of public health.

The emerging concept of an academic health science center seems to be attracting much favor, and has significant implications for the future of education for community health. A health science center should, I suppose, incorporate at least three different health professions schools into a single administrative structure. Some fears have been expressed that in this environment, a school of public health would lose its identity, and the important functions served by the school may be slighted in the competition for funds and space. That this hazard is real cannot be denied; the track record of the medical schools in supporting these functions is not bright. However, only so much protectionism is defensible and if the schools of public health can only survive in some kind of academic sheltered workshop, then we might as well bid them a fond farewell.

Most of the academic health science centers seem now to be federations of autonomous faculties, and as long as this persists, most of the potential advantages of the structure cannot be realized. Almost certainly, therefore, schools within the centers will be required to give up some of their independence, and the boundaries between them will become blurred and perhaps disappear completely. In other health professions as well as in community health, scientific disciplinary identification is no longer an appropriate base for solving problems in the field, and hence not a satisfactory approach for education in these professions. A number of institutions have adopted procedures emphasizing the values of synthetic, systems-oriented teaching. Conceivably these ideas eventually may be reflected in changes in administrative structure, and problem-centered units, established without regard for traditional departmental forms, may become more common.

An adaptation of matrix management is a useful way to preserve some of the advantages of aggregation of persons of like background and yet provide mixes of disciplines as needed to attack broad problems. A health science center can easily be conceived of as a system of linked matrices, with the linkages occurring both according to the problem addressed and by discipline. As the linkages increase in number, the distinctiveness of the schools will decrease, and eventually a school might come to be no more than a specially dense cluster of activities in the total constellation.

DISCUSSION

Kenneth D. Rogers

I have no quarrel with Dr. Stallones reconstruction of the past. I find it credible and agree with him that one's view of the origins of schools of public health is heavily dependent upon one's personal experience—the school with which he has been associated.

I would add a few observations about the past. In the halcyon 1950s and 1960s, schools of public health were twice blessed: they had the opportunity to share in the largesse of federal support of biomedical research and they had benefits accruing to their unique status as health profession schools. They were able to accept institutional support as well as specific support of their educational programs at a time when such support from public funds was effectively opposed by organized medicine for schools of medicine—the other major category of health professions school.

The mutterings about the relevance of the core curriculum, which Dr. Stallones noted, may have been uttered in the mid 1950s but they were (where I was) more the attempts of thoughtful professionals to achieve excellence and to improve what already was considered good than to question the fundamental value of the entire enterprise. There were questions as to whether schools were addressing the problems of mental health, chronic disease, and aspects of the physical environment other than water and sewage. Our own school in Pittsburgh added programs in public health, mental health, and radiobiology. Although there were pressures to specialize within departments to the exclusion of exposure to all departments, this tendency was strongly and effectively resisted. The core curriculum was still regarded as an important and necessary rite of passage for anyone embarking on a career in public health.

Dr. Stallones abruptly shifts from discussion of the conventional past to a series of definitions, among them a basic question of the present. "What is public health?" Is it only an integration of separate activities of a number of professions—a coalescence of activities of people from many fields concerned with health and illness in human communities whose discipline is the rationale and purpose for assembling these interests and linkages between them? One interpretation of this question is that public health per se is not a discipline—only an application.

I do not agree with this interpretation, and I do not consider it fruitful to debate it. Health and illness of groups of people is, to my mind, a phenomenon or set of occurrences which differs in a number of ways from health and illness in individual persons. I believe that medicine is a discipline, even though it might be regarded only as the application of physiology, pharmacology, biochemistry, psychology, etc., designed to understand and control individual health and illness. Application of engineering, management science, behavioral science, statistics, etc. to the understanding and control of population health and illness generates a unique body of factual knowledge and concepts which, to me, constitute the discipline of public health.

At a less esoteric level, I should like to add to Dr. Stallones' description of the present. In the past decade, the number of schools of public health has increased from 12 to 18. The number of graduates has doubled (885 in 1961 to 1652 in 1971). During this time, however, there has been little change in the basic product—the terminal master's degree. Over 90 percent of the graduates are in this category. This is at a time when there has been a sharp rise in doctoral degrees in many fields and in which 3–4 years of postgraduate study became almost universal for physicians. During the same decade the proportion of physicians enrolled in schools of public health decreased from 31 to 23 percent and only half the enrolled physicians were U.S. citizens. During the same period, the number of residency programs in general preventive medicine in the United States increased from 3 to 21 and of residents from 3 to 106. The number of physicians enrolled in all preventive medicine residencies (aerospace, general, occupational, and public health) was 219. This was slightly more than the number of U.S. M.D.'s enrolled in schools of public health. This may represent an alternate training route to similar career objectives.

In James Troupin's annual inventory of schools of public health, he identified in 1971 the following professional categories of enrolled students: physicians, administrators, nurses, health educators, statisticians, dentists, bacteriologists, dieticians, biologists, sanitarians, engineers, behavioral scientists, social workers, chemists, pharmacologists, veterinarians, physicists, physical therapists, lawyers, and industrial hygienists.

In testimony before a Senate Committee in 1971 by the Association of Schools of Public Health, this diversity of student backgrounds was stated as a strength. "Only in graduate schools of public health is it possible to find the faculties, students and special curricula representative of the several disciplines and sciences relevant to the solution of today's health problems. Nor only are physicians, dentists, nurses and other basically trained health professionals involved, but also engineers, economists, statisticians, administrators, lawyers, urban planners, and other experts representing natural and social sciences."

Perhaps diversity of professional background was a strength, or at least defensible, in 1920 or so when Dr. Stallones dates the advent of formal public health education programs. The field of public health practice was considerably narrower then, and the diversity of students less. These conditions no longer prevail. I question whether it is any more reasonable to think of a common educational program such as the MPH as the appropriate preparation for all professional persons working in public health than it is to prescribe a common education program for physicians, nurses, and therapists because they all give individual patient care within the hospital.

Thus, in an era of specialization, graduate schools of public health do not appear to have held their relative position among graduate training programs. The master's level preparation, which was infrequent in 1930, is common today. Is today's master's level program in public health a preparation for more than middle level professional activity? Does the engineer or physician really learn to apply his discipline to public health problems and learn the factual and conceptual knowledge associated with this?

My own background in medicine prompts me to ask another question about present public health educational programs. That is, do they use fully (or at all) the real world of public health practice in the way that medicine is taught in a patient care setting? Is public health being taught by those actively engaged in practice, and inquiry being made in the subject areas they profess? This is not to imply that programs should be vocational in orientation (I can write the complete script for that discussion which is standard faculty and curriculum committee meeting fare). It is to imply that educational programs benefit from a reality base in which the precepts being expounded are constantly tested for validity and where the professional role for which students are being prepared is modeled in practice.

The final observation about the present is still too recent to interpret fully and perhaps too painful even to discuss. The blessings of the 1950s and 1960s—research and educational support—have been markedly reduced. It may not be as bad as one dean was quoted to have said in the past that if the Hill-Rhodes money disappeared one month, his school would have to close the next. But the present financial crisis, to my mind, exceeds the adaptive capacity of schools of public health in their present form. Their future form will not be just a modified or altered version of the present, it will have to be something different. Hopefully, it will preserve the strengths and excellence of the past.

Dr. Stallones raises important questions about the future. First, with whom should the public health academic enterprise be associated? Is it with medical schools or with other schools and programs of the university, such as those responsible for teaching economics, management, behavioral science? Second, how should faculties be organized internally? The department, I agree, no longer is the suitable unit for administration, inquiry, graduate teaching, *and* basic teaching. Dr. Stallones correctly identifies this problem as not unique to public health but an inevitable accompaniment of increased knowledge which identifies the artificiality of discrete disciplinary and professional boundaries.

I share what I perceive to be Dr. Stallones' answer to the first question, that in the foreseeable future, schools of public health will continue to have more in common with other schools of the health professions especially medicine, than with other schools and programs of the university.

Therefore, schools of public health should preserve, and likely increase, their associations with medical and other health professions schools.

With respect to internal organization of resources, I also agree with Dr. Stallones. A problem-oriented organization often is fruitful. The increase in centers and program projects at least attests to the current popularity of this view with funding agencies. An essential attribute of the problem-oriented organization is that it be ad hoc and capable of ready, easy dismantlement and reassembly in other forms to meet new problems. The interdisciplinary organization also has worked well in our medical school for basic introductory teaching and in our school of public health for some portions of the core curriculum. I am not convinced of its utility for graduate education and training in individual disciplines. I have had no experience with interdisciplinary programs for this purpose and do not know of the experience of others. I surmise that the educational objectives of graduate education in specific disciplines require a separate identity for the faculty and program.

My final comments on the future concern: (1) the advisability of separating terminal master's degree training in general public health from in-depth graduate training in separate disciplines in public health; and (2) the fringe benefit which might be derived from making graduate education in public health more involved in practice in the areas about which it teaches.

The master's level of training has increasingly become the basic professional degree for many health professions. It probably is adequate preparation for many of these. This training is not definitive professional preparation, and it does not require faculty and program of the competence and complexity of disciplinary graduate education at the doctoral level. If schools of public health concentrated on doctoral level training, it would allow their programs to achieve an excellence and rigor now missing in some. Concentration on doctoral level education would focus and conserve efforts of qualified faculty and would create a milieu in which inquiry should flourish. The present commitment to master's level training to some extent inhibits these developments which would be possible with doctoral level programs. Perhaps master's level programs in public health should be grouped with other terminal master's programs in schools of health related professions. Perhaps they should be placed in schools of nursing, engineering, and public administration as one of the specialty master's programs which are offered as terminal professional preparation in such schools. All the responsibility for teaching in a given area does not have to be the responsibility of a single school or under the supervision of a single administrative unit. Schools of medicine have not assumed responsibility for preparation of all professionals working in medical care.

A major impediment to such change would be the loss of revenue which schools of public health would experience by no longer receiving government subsidies for master's level programs. It may be paradoxical that loss of federal support presents relief from the compulsion of meeting federal requirements for formula grant and traineeship support and permits change of the kind discussed.

If the mission of schools of public health, as often is stated by their representatives, is to prepare professionals to plan, manage, lead, and evaluate programs in the health field, and to investigate and control health hazards in the physical and social environment, then should not schools of public health take active responsibility for these functions? Should they not relate to public health practice as medical schools relate to individual health practice? The fringe benefit from assumption of such service responsibilities (which serve as a base for education and inquiry) may be that they generate financial support for the entire enterprise. Perhaps in the discussion, people who are better informed than I can tell about the Canadian schools. My understanding is that several years ago when health insurance was established by the Canadian Government, departments of preventive medicine were given remunerative contracts to be the evaluation and planning arm of the enterprise. In our own country, a number of medical schools have had financially rewarding relationships with regional medical programs. It does not seem too unrealistic, then, to think that schools of public health might become involved in programs suitable for their educational and research missions and also for producing some revenue.

PART II

UNDERGRADUATE EDUCATION: TEACHING RESOURCES OF DEPARTMENTS OF PREVENTIVE MEDICINE

Chairman: ***Dr. Peter B. Peacock***

5

DEPARTMENTS OF PUBLIC HEALTH, PREVENTIVE MEDICINE, OR COMMUNITY MEDICINE: CURRICULUM CONTENT

Peter B. Peacock

Role identification, teaching methods, and faculty requirements for any organizational unit teaching public health and preventive medicine to medical students must depend to a large extent on what is to be taught. Without a clear and somewhat detailed definition of curriculum content it becomes difficult to establish standards or to prepare national examinations. For these reasons, and to assist those persons responsible for planning teaching programs in this area, an attempt was made to find out what was being taught at the present time. This information could then serve as background material for discussions from which a consensus of opinion hopefully would arise.

Early in June 1973, a circular letter was sent to a random sample of 30 of the 94 medical schools in the United States and Canada for which a department of public health, and/or preventive medicine, and/or community medicine (or some related title) could be identified. This letter asked for an outline of what was being taught in the general areas of biometry, epidemiology, disease control, and the provision of health services; these are the four areas covered by the Preventive Medicine and Public Health Part II National Board examinations. It was realized that considerable overlap in teaching responsibilities between various departments in a medical school existed, but it was assumed that some one department (by whatever name it might be identified) would be responsible for bringing together the teaching in this general area, or would know about it. To the 30 inquiries that were sent, 22 replies were received.

The most impressive feature of these replies was their variety. Required exposure times for medical students varied from over 100 hours to zero. It was apparent that among the variables involved in deciding what was being taught by a department of preventive medicine (for simplicity we will use this generic title from here on) were: (a) the attitude of the dean and other departmental chairmen; (b) the attitude of the students; (c) the viewpoint of the departmental chairman; (d) the number of teaching hours available; and (e) the interests and academic background of available faculty.

Nearly all the medical schools that replied offered some electives in the area of public health and preventive medicine but very few gave any idea as to what percentage of medical students made use of these electives. As might be expected, those medical schools associated with graduate teaching programs in the public health area provided the most impressive lists of potential electives. Electives included special courses in nutrition, comparative health systems, medical economics, medical sociology, computers, medical history, medical insurance, occupational health, philosophy, law, adolescent medicine, preventive cardiology, medical aspects of environmental medicine, and a wide variety of health care topics.

Required teaching exposure for all medical students can be looked at under a variety of headings. The following topics can be grouped in different ways but have been chosen because, by consensus, they are within the purview of preventive medicine rather than medicine, surgery, pediatrics, obstetrics, gynecology, and psychiatry.

BIOMETRY[1]

Some teaching in biostatistics was provided at most of the medical schools sampled. Material covered included sources of data, measures of central tendency, measures of spread, life tables, simple probabilities, confidence intervals, hypothesis testing, linear regression, correlation, introductory computer science, sampling, inference, t-tests, and chi-square tests. It seemed probable, however, that most medical schools were not teaching statistics at this level.

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[1] A subcommittee of the American Statistical Association, the Committee to Effect the Optimization of Medical-Statistical Interactions, under the chairmanship of Dr. Stanley Schor, is now engaged in developing guidelines and a suggested content for a core curriculum in biostatistics.

EPIDEMIOLOGY

It is in the area of epidemiology that perhaps the most startling contrasts are to be found when comparing one medical school with another. The practical assumption must be made that in those medical schools where departments of preventive medicine are not teaching epidemiology this role is being taken over by the clinical departments of pediatrics, obstetrics, surgery, medicine, and psychiatry. Unfortunately, these departments cannot be expected to teach epidemiology in the organized fashion which distinguishes a science from a mere transmission of unassimilated and uncritically reviewed data.

Five departments of preventive medicine specified some teaching time for method and concepts, dealing with such topics as incidence, prevalence, rates, retrospective and prospective studies, and study design in general. Presumably these topics were also covered in the course of case studies, selected seminars, or tutorials described by many more medical schools.

Considering the historical foundation of preventive medicine in communicable disease, it is notable how little attention has been given to communicable diseases in most medical schools by their departments of preventive medicine. Those communicable diseases receiving particular attention were venereal disease, tuberculosis, hepatitis, and nosocomial infections. In one department of preventive medicine, no fewer than 20 hours of teaching were devoted to parasitic diseases. This, obviously, reflects personal interest and probably a shift in the usual teaching responsibilities. The author is aware of a medical school in Connecticut where the department of pathology at present devotes 42 hours of teaching to parasitic diseases, so such emphasis on parasitic diseases is not altogether out of line.

Surprisingly few departments of preventive medicine gave more than a token lecture or two dealing with the epidemiology of noncommunicable disease. Only three gave a lecture devoted to coronary disease (the most important health problem facing the American public today), and only five discussed neoplastic disease. Several more devoted one or more lectures to drugs and alcohol. Other subjects dealt with by various departments of preventive medicine included accidents, homicide and violence, mental health, prostitution and delinquency, suicide, leukemia, diabetes, multiple sclerosis, stroke, arthritis, and cirrhosis. One assumes that many of these topics may be left to departments of medicine but this is questionable.

POPULATION DYNAMICS

Five departments of preventive medicine arranged at least one lecture on population dynamics. One had family planning as the topic to which it gave most attention with as many as eight classes devoted to this subject. From the point of view of licensing examinations, it is assumed that this subject area is also covered by departments of obstetrics though their approach is somewhat more clinical as evident in the examination questions.

No particular reference was made to the area of "vital statistics" in the questionnaire response. One hopes that medical students learn the terminology in introductory lectures, in pediatrics, in obstetrics, or in casual reading, but it is noticeable that correct response rates to questions in this area in national licensing examinations have dropped in recent years.

NUTRITION

Only five departments of preventive medicine devoted specific lectures to nutrition, dealing with malnutrition, obesity, and food handling. Possibly this area is covered adequately by other departments of the medical school, although the attention given this area in National Board examinations by committees other than the Preventive Medicine Committee is very limited and makes this assumption questionable.

DISEASE CONTROL

Considering that preventive medicine is still the most common departmental name in this area, and given the political pressure to apply what we know of prevention, it is surprising that so few departments of preventive medicine make any reference to disease control when listing lecture topics. It may be that this is taken for granted, or that persons with practical experience in applying disease prevention are in short supply in medical schools. It is hoped that many teachers add a few words on prevention and control when discussing a specific condition. Knowing the epidemiology is not enough; for example, the practical aspects of preventing coronary artery disease are only indirectly related to our understanding of risk factors and natural history.

Two departments of preventive medicine gave particular attention to health education and two others devoted at least one lecture to the subject of health screening. Single topics receiving attention in at least one medical school were vaccination, infant mortality, glomerulonephritis, lead poisoning, hypertension, diabetes, tuberculosis, venereal disease, malignancies, and automobile accidents. Since the national licensing examinations pay particular attention to this area, it is apparent that medical students are expected to obtain their information from sources other than departments of preventive medicine. I presume this is obtained frequently from the commonly used textbooks which, unfortunately, are often out of date.

ENVIRONMENTAL HEALTH

Only one department of preventive medicine of those sampled was apparently still paying serious attention to teaching health problems associated with the environment. This is surprising considering student and public interest in this area and the real need for the medical profession to take an educated leadership role in requiring appropriate environmental standards. Specific topics still being taught included water and air pollution, food handling, radiation, and housing problems. This is a far cry from the public health syllabi of the 1930s, with their attention to sewage disposal, the pasteurization of milk, and housing standards, and probably represents a minimum. For most schools, this author feels that the pendulum has swung too far.

OCCUPATIONAL HEALTH

Four medical schools gave lectures dealing with such topics as occupational hazards, black lung, physicians in industry, workmen's compensation, and rehabilitation. Considering the large number of physicians who enter industrial health in one way or another, it is apparent that departments of preventive medicine do have some responsibility in this regard.

HEALTH MANPOWER

About one-third of the departments of preventive medicine that responded described one or more lectures devoted specifically to problems of health manpower. These lectures dealt with physicians, numbers, types and distribution, practice trends, primary care alternatives, and allied health professions.

HEALTH SERVICES

The variety of topics covered in this area by departments of preventive medicine in the various medical schools is tremendous; it is obvious that this is the most popular teaching area at present. A partial listing of topics mentioned included: Medicare, Medicaid, consumer involvement, national health insurance proposals, hospitals, the care of the poor both rural and urban, medical foundations and peer review, quality of care, comprehensive health care, personal health services, health service utilization, ambulatory care, long-term care, health maintenance organizations and pre-paid group practice, and voluntary health insurance. Other subject matter receiving attention included the administration of local, state, and federal health departments, the organization of health services, the measurement of disease outcome, and the impact of health services on the health of a population.

Relatively few departments of preventive medicine arranged lectures specifically entitled *Medical Economics*. Those that were given dealt with such subjects as achievements and shortcomings of health insurance, who pays for health services, and the cost and financing of medical care.

The Public Health and Preventive Medicine Committee of the National Board has had trouble in setting questions dealing with health services because of an inability to agree on what are the correct answers to a number of questions. Not only do differences between states cause difficulties but it also appears that much of this material is impressionistic.

INTERNATIONAL MEDICINE

Four departments of preventive medicine had lectures entitled *International Medicine* but it seemed likely that there was little agreement on a common focus. The topics dealt with varied from the kinds of heart disease found in various countries of the world to the several patterns of health care delivery.

MEDICAL SOCIOLOGY

Several departments of preventive medicine have apparently continued to maintain a real interest in medical sociology, although the number is small. It is probable that this interest depends on the availability of appropriate faculty. Where medical sociology was covered one found such topics as social values, social needs, the politics of health, humanizing health care, senior citizens, bereavement, the blind, attitudes of society toward the chronically ill and disabled, and the price of affluence.

MEDICAL ETHICS AND THE LAW

Five departments of preventive medicine gave some attention to medical ethics, patient-doctor relationships, legal issues in determining the quality of health care, health legislation, terminal illness, and the law in general. The growing importance of these problem areas need not be belabored, and the contribution of preventive medicine departments to the institutional and societal aspects of the subject seems self-evident.

For all of us who are concerned with disease prevention on a national scale it is of primary importance that our medical students be better equipped to be leaders in this area. The final proof of success will be a reduction in age-specific disease incidence in defined populations—a reduction that could be ascribed to positive action by our medical graduates (e.g., smoking cessation advice). We will, however, have to wait for this. Meanwhile we must perforce assume that knowledge at graduation (as measured by the existing examination system) will reflect what medical graduates understand and will practice. It is what the graduates know, accept, and practice that is important, not how they got to this stage.

To develop an effective curriculum we must bear in mind not only what our ultimate goals might be but also how best we can collaborate with others in achieving these goals. We will have more impact on medical education if we work with our colleagues than if we do our striving in splendid isolation.

6

TEACHING RESOURCES: MATERIALS AND METHODS

Richard F. Morton

PRINCIPLES OF EDUCATION

1. Clear specification of learning objectives.
2. Definition of learning steps toward attaining the objective.
3. Selection of appropriate means for implementing these steps.
4. Evaluation of effectiveness with the aim of further improvement of implementation.

CURRICULUM PLANNING

One must first define the end product in terms of what the graduate must be able to do. From this description one can specify levels of competency and hence behavioral objectives. In turn, the means for learning these behaviors become the curriculum (*1*).

DEVELOPING EDUCATIONAL OBJECTIVES

Many faculty members regularly prepare educational objectives for their courses and feedback indicates that most students appreciate listed objectives as a study guide.

Writing educational objectives (*2,3*) may seem to be an added burden to a teaching load. But, those who have made the effort found that objectives help in the preparation of teaching material by challenging them to define precisely the best ways for presenting the material and by evaluating the learning experience. Students have voiced appreciation of faculty who use educational objectives because direction of the course is clear and they know precisely what is expected of them.

Learning may be described as a change in behavior. Educational objectives are statements of the changes in behavior which learners are expected to exhibit following an educational experience (*4*).

An example of objective writing for a course in community health follows:

THE OVERALL COURSE GOAL

Should be:

A general statement of what the student will be able to do following completion of the course.

Encompassing of the entire course.

Written to include an action verb.

Example:

Overall Course Goal for Community Health:

Following the completion of this course the student will be able to describe the methodology and usefulness of diagnosis and treatment of community health problems, as well as describe how the practicing physician and his patient relate to community health programs.

COURSE OBJECTIVES

Should be:

Stated in a problem solving manner when possible.

Encompassing of a range of more specific or enabling behaviors.

Realistic in terms of the learning experiences provided and the time available.

Stated in full-behavioral terms: (1) conditions or givens; (2) an action verb; and (3) criteria for assessment.

Example:

Course Objective for Health Delivery System (Community Health Course):

1. Conditions	When presented with a possible change in the manner of health service delivery the student will be able to
2. Action Verb	predict
3. Criteria	how such change might alter patterns of medical care utilization. Satisfactory achievement will include: (a) an accurate recognition of the basic structure of the health delivery system; (b) identification of factors impinging on the health service system; and (c) justification of why the predicted changes would occur.

TASK OBJECTIVES

Should be:

Placed immediately after and relate specifically to a course objective.

Specific; the level of detail expected should be conveyed through phrasing and quantity.

Stated in a manner as to convey the types of items which may be included in a specific test.

Written to include an action verb.

Example:

Task Objectives for Health Delivery System (Community Health Course):

1. List the various government, voluntary, and private agencies which deliver health care within the United States, noting the geographic and socioeconomic nature of the populations they serve.
2. Identify present patterns of out-patient care utilization including: the private practitioner, hospital out-patient clinic, university hospital, emergency room, and neighborhood health care centers.
3. Predict change in utilization of medical services by the medically indigent if—
    a. access were improved at the neighborhood level, and
    b. third party coverage paid for all costs above a small deductible fee.
4. List the problems of a medical school and university hospital which are likely to occur when suddenly they become responsible for the health services of a defined geographic community.
5. Identify the characteristics of a national health insurance plan and the alterations in the existing system which would occur if brought into effect.
6. Distinguish the HMO as public policy agent from previously existing prepaid comprehensive group practices.

EVALUATION

Evaluation of student performance is an important aspect of the teaching-learning process (*5*). It not only enables the student to determine if he has learned, but also provides a guide to the teacher in developing learning experiences which will help the student reach the desired performance level.

Assessment procedures (verbal and written examination, demonstration of skills, and clinical performance ratings) should be specified to students. Statements regarding departmental and course evaluations should contain the criteria used for determining minimal performance and honors. The number of examinations, whether the examination covers all materials or specific material, and the examination format should also be made known.

EDUCATIONAL STRATEGY

The teaching method used should always be chosen in conjunction with the objective to be taught, and with the evaluation. These three items—objective, instructional method, and evaluation—comprise a module. Each module is assembled and placed in sequence to construct the course. The objectives are first listed in detail, the instructional resources are then matched to these objectives, the teaching tasks are outlined, and the evaluation specified.

VARIETIES OF TEACHING METHODS

In teaching preventive medicine, the range of methods which may be employed is as broad as those employed in any other medical discipline. No one method is assumed to be superior, and a ranking should not be attempted. Rather, the various methods should be perceived in the context of components of a spectrum, each employed when best suited for a particular objective.

The teaching method cannot be divorced from the objective to be taught, or the evaluation method chosen to test this objective. The objectives of any course may be classified in turn under three domains of learning: cognitive (head), psychomotor (hands), attitudinal (heart).

In general, cognitive objectives are the easiest to teach and evaluate. Lecture, small group teaching, seminar, and self-instructional programs may all be used. Multiple-choice questions are the preferred method for evaluation.

While psychomotor skills may be introduced by means of a film for example, learning techniques must be acquired by simulation (*6*) on a model, or by practice in a clinical or laboratory setting. Evaluation requires performance of the newly taught skill in a predetermined test setting.

Words and Phrases to be Avoided When Writing Objectives

- believe
- capacity
- comprehend
- conceptualize
- depth
- experience
- feel
- hear
- intelligence
- know
- Show:
  - appreciation for . . .
  - attitude for . . .
  - awareness of . . .
  - comprehension of . . .
  - enjoyment of . . .
  - feeling for . . .
  - interest in . . .
  - knowledge of . . .
  - understanding . . .
- listen
- memorize
- perceive
- realize
- recognize
- see
- think
- self-actualize
- understand
- Become:
  - acquainted with . . .
  - adjusted to . . .
  - capable of . . .
  - familiar with . . .
  - interested in . . .
  - knowledgeable about . . .
  - self-confident in . . .

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Attitudinal objectives are the most difficult to achieve. They may be acquired through role model, preceptor teaching, and seminar interaction groups. Evaluation usually must be indirect by questionnaires, problem situations, and observation. A simple analogy for the three types of learning objectives may be drawn from the procedures of learning to drive an automobile. Testing for the highway code constitutes cognitive knowledge. Operation of the vehicle is a psychomotor skill. But the manner displayed while driving, be it defensive, aggressive, erratic, or predictable, is an attitudinal objective—difficult to teach and difficult to evaluate.

Action Verbs, for Stating Cognitive Objectives

Simple Tasks
- choose
- complete
- define
- describe
- detect
- duplicate
- find
- identify
- indicate
- label
- list
- match
- name
- order
- provide
- recall
- recognize
- repeat
- select
- sort
- state
- underline

Study Skills
- arrange
- categorize
- chart
- classify
- compute
- diagram
- document
- follow
- formulate
- itemize
- organize
- quote
- record
- reproduce
- signify
- suggest

Analysis Skills
- analyze
- appraise
- combine
- compare
- conclude
- contract
- criticize
- deduce
- defend
- differentiate
- discriminate
- evaluate
- formulate
- generate
- induce
- infer
- interpret
- list reasons for
- paraphase
- plan
- present
- save
- shorten
- structure
- switch

Synthesis Skills
- alter
- change
- design
- develop
- discover
- expand
- extend
- generalize
- modify
- predict
- propose
- produce
- question
- rearrange
- recombine
- reconstruct
- regroup
- reorder
- rephrase
- restate
- restructure
- rewrite
- signify
- simplify
- synthesize
- systematize

Ascending order of difficulty.
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Each of the teaching methods to be described in this paper must be related both to a learning objective and an evaluation procedure, each planned in a teaching setting. This forms identification of the best instructional resources.

PROBLEMS OF STUDENT PERCEPTION OF PREVENTIVE MEDICINE

One problem peculiar to preventive medicine stems from the diversity of fields now included within the discipline. A second difficulty lies in giving weight to the subject as the students see it. The degree of credence given our courses by students inevitably mirrors their perception of the relevance of the subject to their professional lives (*7*). The students' view reflects the position of the specialty with reference to the several clinical specialties. To promote the inclusion of a preventive medicine approach in the teaching of the major clinical fields, it is necessary to inculcate understanding and support of the principle of preventive medicine within the faculty, specifically our clinical colleagues. The presence of the department must be readily felt in the clinical arena of the teaching center. From the visible profile thereby presented, our subject is in a position to gain a corresponding rating in student assessment.

INTERDISCIPLINARY TEACHING

The contribution of preventive medicine is often displayed best in collaboration with other disciplines during a panel discussion. The emphasis varies with the disease but should include the natural history of the disease in the community, the spectrum of the disease in the individual, and the public health problem posed by the disease. Epidemiology is used to illustrate etiological factors, assess predictive risk factors, and analyze the effectiveness of treatment. Any interdisciplinary presentation faces several pitfalls that must be guarded against and several precepts that must be adhered to if a successful session is to follow. Someone must plan, moderate, and coordinate the session; two or three participants must outline the objectives of the teaching session together. Each delineates his contribution and allotted time. Planning is mandatory, but flexibility is desirable. Brief presentations by each participant, preferably linked together by a moderator, are most effective. An open discussion with questions from students should follow. Repeating each question ensures that the audience knows what is going on. Debate among the panelists should always be thought-provoking. The moderator should always summarize. Participants should be chosen to exploit recent advances in the subject and to show the public health impact of the disease.

Examples:

- Multiple Sclerosis: epidemiology balanced with immunological discussion.
- Epilepsy: not only its prevalence but the opportunities and limitations of employment for epileptics.
- Cancer of the Cervix: including input from a virologist working with the Herpes II (genitalis) virus.
- Breast Cancer: with a surgeon and radiologist reviewing mammograms and comparing this with other screening procedures.
- Coronary Heart Disease: the major risk factors may be demonstrated by taking a history from a single cardiac patient.

These interdisciplinary exercises bring preventive medicine into the hospital world and enhance the students' learning.

Collaboration with clinicians through attending departmental rounds and conferences provides an opportunity to discuss the epidemiology of the diseases in question, thus teaching some of the clinical faculty and keeping preventive medicine in the mainstream of medical teaching.

FORMAL LECTURE

This method remains one of the best for the delivery of new information to large numbers of students. Currently, the lecture method is in disrepute as a teaching technique. This is due to deficiencies in lecturers, not in the method (*8*). Generally, there is no systematic attempt to teach the art and science of lecturing, although it is to be hoped that this situation will be corrected by the new departments of medical education appearing in some of our medical schools. Most of our schools do have examples of excellent lecturers, but they are rarely asked to pass on their skills. Unhappily, if teachers are poor lecturers, little is done to prevent them from alienating large groups of students while exercising their shortcomings. The students then develop such a low expectation of lectures that attendance shows a steady attrition as the semester advances. This situation is partially remedial, in that, although the artistic aspects of lecturing (elocution, verve, and flare) may forever elude some faculty, even a novice can be taught lecturing as a science. A list of the points to be made during a lecture, a variety of vivid examples, and reinforcement through summary of the points covered can all be taught (9). Rehearsal and critique from a faculty audience should be used.

The lecture should be accompanied by a handout distributed at the beginning of the lecture. Controlled studies have shown that students learn more if (a) a handout is used (*10*) and (b) such handout is given at the start of the lecture rather than at the finish (*11*).

Students relate better to one or two lecturers rather than a bewildering progression of different faculty even from the same department. Poor results may be assured by inviting a series of visiting lecturers, each an "expert" on the topic under discussion. The visitor is usually under several handicaps. He does not know what has been taught previously, what will be taught in the remainder of the course, and he has difficulty adjusting the level at which to aim the lecture. Some are too abstruse or advanced and others too simple, repeating material given previously, an action viewed by students as insulting. The visiting expert invariably includes far too much detail and is prone to engage in name dropping and references to personal controversies within his field, which are of little value to students. Those responsible for core courses should combat their urge to invite visiting experts to lecture, especially in the medical school curriculum. Even if the lecture is a success in the opinion of faculty, it is rarely of lasting value to the student, for it always stands alone, not building on the previous knowledge gained.

There are situations however, particularly in a discipline as diverse as preventive medicine, where use of a visiting lecturer is appropriate. Examples might include medical malpractice, where an attorney specializing in this area may deliver a most effective presentation. The local medical society can always identify an attorney versed in medical legal issues, usually defense oriented. These lawyers bring the aura and rustle of the courtroom into the lecture hall and give a practical approach, supported by current examples from their experience. This is much to be preferred to an academic presentation from the law school.

Programs based in a community hospital, and the relationships with and problems of such hospitals, are usually best related by someone intimately concerned with the operation of the programs such as the director of ambulatory care.

A minister, or possibly a chaplain from the hospital, may be invited to discuss topics such as death and dying, prolongation of dying, euthanasia, quality of life, and kindred subjects in medical ethics. These may be given in a discussion format together with a clinician.

These three examples are cited in illustration of the use of outside lecturers who bring a specific point of view, knowledge, and expertise not available in regular departmental faculty. In order to use outside lecturers effectively, both sides should clearly understand the objectives and the evaluation to be used. Visiting lecturers should be asked to provide written objectives, a handout to accompany their lecture, and some multiple-choice questions. These requests, prior to lecturing, are becoming increasingly common, but are resented by some. The discipline that this imposes on the course director who invites the lecturer, and the lecturer who accepts, is beneficial to both and to the students. The lecturer should be supplied with feedback from the students both in the form of an assessment where the students are asked to grade the lecturer on a scale of 1 to 5, and the students' performances on the multiple-choice questions.

In summary, if the course director and the visitor know precisely which objectives they want to cover, the lecture will be fruitful.

SMALL GROUP TEACHING

This format has had an intensive trial in preventive medicine, particularly in teaching biostatistics and epidemiology. The advantages are that a large class, say 150 students or more, may be divided into six groups of 25 students each. This enables the instructor to delve into principles and concepts and to demonstrate a problem-solving approach. Students can be guided through difficult steps, and examples illustrating applications can be used.

The disadvantages of small group teaching stem from the very diversity of instructors. They vary in competence, style, pace, emphasis, and teaching effectiveness. Teacher differences can be minimized by taking steps to assure a common understanding of objectives among instructors. The faculty member in charge of the course should list objectives and the terms to be defined for each session for both students and instructors. Following each teaching session progress reports should be assembled for review. Where several instructors are used, one faculty member should be designated as ambulatory, visiting several of the groups and observing the teaching process. This insures some degree of uniformity, and it is helpful, at the instructors' meetings, to have one person qualified to compare reactions of the student groups.

Students should be encouraged to contribute and question during the session, as a form of participatory learning. But their input, or attitude, should not be used as part of the evaluation process. The student must feel secure enough not to be fearful of exposing weaknesses to the instructor. Student assessment is a separate procedure clearly detailed to the student at the beginning of the course.

Some points for effective teaching in small groups:

1. Spell out your objectives very clearly.
2. Evaluation should never be used when students are learning a new skill or behavior.
3. Small groups are not the best method to impart new information.
4. Small groups are for "self-discovery."
5. The learner must understand what is to be learnt, how it is to be learnt, why it should be learnt, and if it should be remembered.
6. The reward/punishment system still works very well.
7. Most people want to succeed; we have to direct their efforts towards success.
8. Do not teach all that you know.
9. Permit students time for internalization.
10. Involve the students in group discussion. Let them explore and invest in the subject.
11. Let one student help another.
12. Encourage students to work in pairs.
13. A setting conducive to learning is most important.

SELF-INSTRUCTION MATERIAL PROGRAMS (SIMP)

With increasing student enrollment, heterogeneity in student background, and variability of preparation in the biological sciences, self-instructional methods have many assets (*10*). Obviously, programmed instruction requires a faculty skilled both in preparing materials and in adequate testing to insure the effectiveness of the program. The advantages of the method are:

1. Rate of instruction can be varied, depending on the capacity of the individual student.
2. Instruction can be repeated as often as necessary.
3. Instructional materials can be reproduced for many students.
4. Instruction can be made available for study at any time.
5. Faculty are freed for the role of clarifying specific problems.
6. Student participation can be encouraged with continual feedback.
7. Motivation for learning can be immediately reinforced.
8. Students with language difficulty can adapt well to these programs.

Disadvantages of the method are:

1. A need for faculty support through contributions, recommendations, and attendance in the independent learning center during busy hours.
2. Students must be tested on the material taught, for they tend to assume that this is what faculty deem important.
3. The independent learning center must be situated in an ideal location and remain open during the most convenient hours.
4. The center must be continually supplied with a quantity of good material.

Each self-instructional material program (SIMP) is constructed in a similar fashion (*12*). The objectives are listed and taught in sequence and each is a step in learning. The student is guided through the steps and a test follows each to assure mastery before proceeding. The SIMP is concluded by a post-test.

There are several methods of presenting a SIMP. One is a student workbook (*13*). Economy, simplicity, and mobility of the workbook are its great assets.

Another method of presentation is the slide-tape program. In this, the script is recorded and coordinated with a series of illustrations in color featuring either line diagrams, cartoons, or photographs. The technology is simple, robust, and inexpensive. The effectiveness of the presentation is heightened by the inclusion of a large number of imaginative illustrations. For a 15-minute program 65 illustrations would be adequate (*14*).

TECHNOLOGICAL HARDWARE

This method (SIMP) does not require expensive, elaborate instruments, although it is frequently confused with their use. The disadvantages of elaborate technological teaching aids are:

1. Mechanical breakdown.
2. Faculty unable to use the machine.
3. Learner unable to use machine.
4. Vandalism.
5. Theft.
6. Obsolescence.
7. Garbage in—garbage out.
8. Cost.

The self-instructional materials project of the Southern Medical Schools' Consortium (based at the School of Medicine, University of North Carolina, Chapel Hill, North Carolina 27514 [telephone: 919/966-5170]) maintains a catalog, which is updated continually, and a newsletter, and mounts a series of workshops for those wishing to learn how to write SIMP. For interested faculty you need a topic that you have taught several times, are thoroughly familiar with, and know the points at which students habitually make errors. Some good illustrations or line drawings are of great help. After attending a 2-day workshop in Chapel Hill, you can construct a SIMP.

SEMINAR TEACHING

This should be distinguished from small group teaching. Frequently the latter is misnamed a seminar. The definition of seminar is a "a group of advanced students studying under a professor with each doing original research and all exchanging results through reports and discussions." (*15*). This type of teaching is ideally suited for postgraduate students, for undergraduate students doing elective work, and for residents. It is rarely practical for a large class. Essentially, the input should be by students and the role of faculty restricted to that of direction, clarification, criticism, and evaluation.

FILMS

The use of films in teaching preventive medicine is happily very rare, as there are few films that are suitable for the subject. As an instructional technique, films are useful in the introduction to learning a skill or developing an attitude (as seen in the film *Hospital* produced by Frederick Wiseman). Recourse to films as the mainstay in instruction is an abdication of the teaching responsibility. Furthermore, in the selection of films, faculty should be aware that it is most difficult to get an objective appraisal of a film in advance, and once having received the film, the temptation to show it is overwhelming.

CONCLUSION

The writing of precise, detailed, specific objectives is fundamental to effective teaching. The input needed for the student to achieve these objectives is then defined, and the evaluation method to test his attainment is then linked to each objective. Throughout the course, the instructor should strive to gain active student participation, which is a vital ingredient of learning.

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7

BEHAVIORAL OBJECTIVES FOR PREVENTIVE MEDICINE

Robert L. Kane, Frederic Bass, and Samuel Bosch

The objectives that follow have been written in a framework of terminal learner behavior. In effect, each statement should be interpreted to begin with "The student should be able to. . . ." The intent of the list is merely that of illustrating how such objectives may be constructed. In no sense is the list exhaustive, and, admittedly, some items are couched in ideal terms. Moreover, some would be appropriate only for the medical student who has had an exposure in depth to a particular part of the preventive medicine curriculum.

These objectives were assembled by the authors acting as a committee of three at the request of the Fogarty Conference on Teaching Resources. They are grouped under four commonly employed divisions of preventive medicine content:

I. Medical Care Organization
II. Epidemiology and Biostatistics
III. Environment and Disease Control
IV. Behavioral Science, Health Education, and the Law

I. MEDICAL CARE ORGANIZATION

1. List the several steps in the process of getting medical care, and the potential impediments to each step. List should include at least: recognition of illness, decision to seek care, presentation for care, care process, and compliance.
2. Analyze demographic characteristics of a patient population using a physician's office to contrast it with population in potential target area.
3. Compare a randomly selected sample of a community with a group of patients in a doctor's waiting room in terms of: (a) social class; (b) proportion who are likely to be ill; and (c) probable attitudes toward medical care.
4. Distinguish between need and demand for medical care.
5. Discuss the implications of medical care as a right from the perspective of: (a) government; (b) physician; and (c) consumer.
6. Define the following: coinsurance, deductible, indemnity, health maintenance organization, peer review, Medicare, Medicaid, capitation, cost-effectiveness.
7. Contrast a national health insurance plan and a national health service system.
8. Describe the role of third party insurers in controlling medical care costs.
9. Compare different forms of a medical practice in terms of professional autonomy, quality of care, income, and time devoted to work:
   a. solo practice
   b. partnership
   c. single specialty group practice
   d. multi-specialty group practice
   e. prepaid group practice
10. Describe the structure of a prepaid group practice as represented by the Kaiser system.
11. Distinguish between different forms of physician payment:
    a. fee-for-service
    b. salary
    c. capitation
12. Discuss prepaid group practice in terms of its effects on:
    a. ambulatory care utilization
    b. hospital utilization
    c. overall costs of medical care
13. Distinguish between a voluntary and proprietary hospital.
14. Outline the relationship of the medical staff of a voluntary hospital to the governance of the hospital to the hospital administration.
15. Discuss the hospital nurses' dual lines of responsibility to the physician and the hospital administration, and the problems presented by it.
16. Match a given set of patient descriptions to the appropriate level of care for each from the following list:
    a. acute care hospital
    b. skilled care nursing home
    c. personal care home
    d. home care
    e. ambulatory care

17. Describe the level and extent of training of each of following:
    a. family practitioner (board eligible)
    b. cardiologist (board eligible)
    c. neurosurgeon (board eligible)
    d. pharmacist
    e. registered nurse
    f. licensed practical nurse
18. Given an appropriate patient problem identify potential roles to be played by each of the following:
    a. public health nurse
    b. social worker
    c. physical therapist
    d. vocational counselor
    e. nutritionist/dietician
19. Given an appropriate patient problem, write a request for specialist consultation.
20. Discuss physician's role in influencing access to care: (a) inpatient; and (b) outpatient.
21. List barriers to access for an indigent patient seeking: (a) private medical care; (b) care from a public institution.
22. Distinguish among the three major elements in the measurement of quality of care: process, outcome, and organization. Suggest possible criteria for each of the three elements for a given problem.
23. List the dimensions by which the outcomes of medical care might be examined.
24. Identify the major components of medical costs, the relative size of each, and those over which the physician has control.
25. Identify the major components and relative magnitude of hospital costs.
26. For a given set of patient descriptions identify community resources which might be most helpful for each. List of resources would include the following:
    a. local health department
    b. visiting nurses
    c. comprehensive mental health center
    d. vocational rehabilitation service
    e. Alcoholics Anonymous
    f. Crippled Children's Services
    g. Division of Family Services
    h. child welfare services
27. Analyze a patient population using a physician's office in terms of types of problems presented and extent of workload which could be delegated to someone other than a physician (e.g. physician assistant or nurse practitioner).
28. Describe the major social, political, economic, and health factors which must be considered when developing a comprehensive medical care plan for the community.
29. Identify available resources (including structure, availability, payment methods, quality of services, etc.)
    a. existing health care delivery systems
        1. private sector services
        2. governmental services
    b. funding sources, manpower sources, and organization for systems not currently available.
30. Determine and set priorities for attacking problems using a variety of techniques, e.g.:
    a. cost benefit
    b. cost effectiveness
    c. ethical considerations
    d. political expediency
    e. public demand
31. Identify the kinds of services provided in an acute, general hospital and the sources of payment for each.
32. Compare cost-benefits with cost-effectiveness analysis, and identify their applications to health care delivery.
33. Estimate within 10 percent the proportion of the U.S. adult population with insurance coverage for each of the following:
    a. Inpatient acute hospital services
    b. Inpatient chronic hospital services
    c. Outpatient or ambulatory physician care
    d. Prepaid dental care
    e. Prepaid medical care
    f. Psychiatric outpatient services

II. EPIDEMIOLOGY AND BIOSTATISTICS

1. Define each of the following terms: rate, incidence, ratio, prevalence, fertility rate, crude birth rate, mortality rate, infant mortality rate, mortality ratio, relative risk, absolute risk, confidence interval, case history study, cohort study, statistical significance, and independent variable.
2. List the three major demographic factors which should be considered in comparing rates of health problems among different populations.

3. For each of the following disease processes choose three factors from the accompanying list which have been shown to be associated with the disease.

Disease processes
breast cancer
coronary artery disease
cervical cancer
tuberculosis
peptic ulcer disease
chronic bronchitis
glomerulonephritis

Factors
marital status
socioeconomic status
age of first pregnancy
smoking
dust exposure
psychologic stress
air pollution
streptococcal infection
exercise
obesity

4. Describe the requisite elements of a study to test the effectiveness of a form of medical intervention (a clinical trial).
5. Contrast a study of the relationship between smoking and lung cancer with a study of the effectiveness of rheumatic fever prophylaxis.
6. For each of a set of descriptions of study results, indicate which statistical test of significance would be most appropriate—chi square, t-test, both or neither—and defend the choice.
7. Interpret a set of graphs to determine whetner an association of the variables is shown and if so what kind.
8. Match each of the following terms to a series of case examples and identify the appropriate application or interpretation of an example of the following terms:
   a. cohort, case-control, and cross-sectional studies
   b. dependent and independent variables
   c. incidence and prevalence
   d. rate and ratio
   e. specific and adjusted rates
   f. relative and attributable risk
   g. reliability and validity
   h. specificity and sensitivity
   i. bias and selection
   j. ecological fallacy
   k. secular trend
   l. statistical significance, *P*-value, and medical significance
   m. probability
   n. χ^2 and student's *t*
   o. regression and correlation
   p. determinants of sample size adequate
   q. histogram and cumulative distribution graph
   r. nominal, ordinal, interval, and ratio scales
   s. mean, median, and mode
   t. prognostic stratification
   u. chance, secondary, direct, indirect, and spurious association
   v. multifactorial etiology of disease
   w. simple random, systematic, stratification, and cluster sampling
   x. hypothesis
   y. blinding
9. Use the above items appropriately in a critical review of a current study or literature report, chosen by the student from the following areas:
   a. acute and/or chronic infectious disease (hepatitis, etc.)
   b. acute and/or chronic noninfectious disease (hypertension, etc.)
   c. limited interventional studies (drug or surgical treatment)
   d. large group interventional studies (drug, educational, etc.)
   e. health-related behavior (patient compliance, attitudes, etc.)
   f. health care delivery (use of paramedics, medical record keeping, etc.)
   g. multiphasic screening
   h. quality of care assessment
   i. environmental disease (physical, social, cultural)
   j. health and disease surveys (analytic)
10. Outline an epidemiologic approach to a problem selected from another area listed in (9) other than that chosen for the critique. In the outline student will identify the population involved, the population at risk, the dependent and independent variables, other pertinent influencing factors; student will describe the interrelationships of these variables and factors. Student will include formulation of an hypothesis, selection of appropriate study model, means of minimizing spurious associations caused by study design, and a tabular display of projected (dummy) results.
11. List the major factors affecting population growth.
12. Match a set of population pyramids with a set of descriptions of different countries.
13. Compare the community-based approach with

the patient-centered approach to the definition, diagnosis, and treatment of health problems.

14. Apply the techniques of community analysis to describe and develop solutions for local health problems for an identified community.
15. Establish necessary data base for analysis of community health problems from among types of data, e.g.:
    a. health records
    b. demographic data
    c. vital statistics
    d. environmental
    e. social, cultural, and historical
16. Identify and gain access to sources of data, e.g.:
    a. health care facilities (including hospital records)
    b. public safety (traffic accidents)
    c. schools (attendance records, etc.)
    d. welfare
    e. individual in community
    f. industry (absenteeism, retirement, safety, etc.)
    g. insurance
    h. National Health Survey data
17. Construct and apply appropriate instruments for various methods of data generation and collection, e.g.:
    a. personal interviews
    b. mail questionnaires
    c. telephone surveys
    d. health diaries
18. List four different types of transmission of disease and give an example of each.
19. State the likely sources of the following information in your community:
    a. incidence of coronary heart disease
    b. prevalence of arthritis
    c. prevalence of involutional melancholia
    d. distribution of birth weights
    e. mortaility rate from staphylococcal pneumonia
20. For a given disease describe a set of diagnostic criteria which takes into account the biologic gradient of that disease.
21. Contrast the prevalence of classic textbook descriptions of a given disease with other forms found throughout its natural history.

III. ENVIRONMENT AND DISEASE CONTROL

1. For one health problem from the following, list the environmental hazards which might cause or exacerbate the problem; describe ways in which these hazards might be eliminated and reasons why this might not be done.
    a. salmonellosis
    b. hepatitis
    c. chronic bronchitis
    d. lead poisoning
    e. automobile accident
2. For each of a series of occupational histories of patients list the major hazards which should be anticipated; for each hazard indicate the clinical manifestations expected.
3. Match the type of intervention listed in column 1 with disease(s) prevented by it in column 2.

Column 1	*Column 2*
placing an environmental barrier between agent and host	malaria gastrointestinal infections chronic bronchitis pellagra asbestosis
increasing resistance of the host	polio diphtheria pertussis measles alcoholism heart disease
destroying the agent and thereby preventing its spread	tuberculosis syphilis gonorrhea
early detection	diabetes mellitus iron deficiency anemia cancer of the cervix breast cancer

4. List the attributes of a good screening test and apply these criteria to each of the following:
    a. pap smears for cervical cancer
    b. pap smears for lung cancer
    c. tonometry for glaucoma
    d. vision testing for refractive errors
    e. EKG for coronary artery disease
5. Distinguish among primary, secondary, and tertiary prevention in the context of the preven-

tion of renal failure and the prevention of lung cancer.

6. For each of the following diseases list one nonmedical activity which would have a major impact on the incidence of the disease and give the expected intermediate effect:
   a. heart disease
   b. lung cancer
   c. stroke
   d. automobile accidents
7. Define the activities of daily living.

IV. BEHAVIORAL SCIENCE, HEALTH EDUCATION, AND THE LAW

1. Given a disease from the following list, discuss the social and cultural factors which may be involved in its causation:
   a. stroke
   b. heart disease
   c. cancer of the lung
   d. peptic ulcer disease
   e. pulmonary
   f. tuberculosis
   g. schizophrenia
   h. pneumococcal pneumonia
   i. automobile accidents
2. Given a patient who has not followed medical advice, identify the possible reason(s) for noncompliance and design a therapeutic program which would lessen the chance of noncompliance.
3. Explain to three patients from different socioeconomic strata the implications of their disease in a way that they can explain it adequately to a third party.
4. Explain to the same patients the therapeutic regimen planned in a way that they can explain it adequately to a third party.
5. Describe the medical student's own changes in self-image since entering medical school and compare these with descriptive studies in the literature.
6. Observe a series of doctor-patient interactions and identify where the physician shows: (a) positive (supportive) behavior and where he shows nonsupportive behavior; and (b) authoritarian behavior vs. participatory behavior.
7. Identify a hospital policy which impedes patient care and/or comfort; and design an alternative which would be feasible to both hospital administration and the medical staff.
8. Counsel the family of a chronic disease patient on the patient's prognosis and alternative ways to care for him.
9. Discuss means to assure confidentiality of patient data and the restrictions these impose on the physician.
10. Given a series of case histories determine whether the physician's actions in each suggest malpractice.
11. In a mock trial give testimony (using a case history provided) which remains consistent under cross-examination.
12. For each of a series of case histories identify whether the physician fulfilled his contractual responsibility to his patient.
13. Discuss euthanasia as an alternative for each of the following:
    a. an 85-year-old man with metastatic cancer who asks to die
    b. a 30-year-old guadriplegic mother of three who asks to die
    c. a 55-year-old man with a brain tumor comatose for three weeks
14. Discuss abortion as an alternative for each of the following:
    a. an 18-year-old unmarried college student six weeks pregnant
    b. a 26-year-old mother of two exposed to rubella in the first trimester
    c. a 17-year-old Negro high school student who was gang raped
15. Recognize major questions of policy involved in the debate over selected sociomedical issues, e.g., abortion—birth control—population, alcohol—drugs, etc.
16. Recognize issues in selected problems in medical ethics, e.g., transplantation, definition of death, physician responsibility to care for the sick (and "free" medical care), the "good samaritan" role, etc.

8

EPIDEMIOLOGY, DEMOGRAPHY, AND BIOSTATISTICS IN A PREVENTIVE MEDICINE CURRICULUM

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This chapter is an attempt to provide an outline of what should be covered by every department of preventive medicine in formal teaching in the areas of epidemiology, demography, and biostatistics. Prior to doing this, it is necessary to note two problems facing every department chairman, namely, the limited number of hours available for teaching in these areas and the year(s) in the medical school course curriculum that shall be assigned to the department of preventive medicine. In schools that have adopted a 3-year curriculum, there may be little choice for either student or faculty. Even in 4-year schools, much of the teaching in preventive medicine is relegated to the first 2 years. Since there are many clinical points in teaching materials used in epidemiological instruction, it is desirable to attempt to carry out teaching in the latter part of the second and preferably in the third and/or fourth years. It would appear self-evident that the more mature the student and the more clinically knowledgeable, the more receptive he or she is likely to be to preventive medicine teaching. On the other hand, epidemiology, biostatistics, and demography comprise the basic science of preventive medicine, and not a few medical schools prefer to introduce students to these subjects even in the first year of the medical course. During the first year, anatomy, biochemistry, and physiology each have larger blocks of time, and in this competitive situation, the time available for preventive medicine is distinctly limited. By the second year, students are looking forward to the clinical years and are likely to be exposed to some aspects of clinical medicine. This is an ideal time to expose them simultaneously to preventive medicine concepts—before they get fully involved in clinical problems that focus on individual patients rather than on the patterns of and the risk factors involved in disease occurrence.

As to the minimum time required to teach in these areas effectively, there is generally not sufficient time, and some schools even fail to provide formal instruction in the use of quantitative methods despite their increasing use in medical and scientific work.

EPIDEMIOLOGY

There is much variation in teaching approaches to epidemiology. The polar views are represented by those who give a traditional course focusing on communicable diseases, and those who reject this emphasis in favor of preparing the student in how to better read the literature or having the student develop skills through problem solving. Some feel that the focus should be predominately on delivery of health care in the United States and problems inherent therein. While the various departments appear to have totally disparate approaches to teaching, there is, in point of fact, a substantial overlap. Even preventive medicine courses that focus on critical reading ability or problem solving draw upon a great deal of traditional epidemiologic teaching concepts. The recent spate of new textbooks in epidemiology reflects both the rising importance of this subject in medical education and the variation of teaching approaches.

In representing what every student should be taught in epidemiology, we have drawn upon the experience of others. There follows below, for the most part in outline form, a consideration of (A) teaching objectives; (B) specific terms or concepts; and (C) substantive disease areas that warrant attention.

A. Teaching Objectives

One general aim of a course is to familiarize the student with certain concepts and methods. The following outline is taken from the objectives listed for a course organized by Roger Detels, M.D., Professor of Epidemiology at the University of California at Los Angeles:

1. What are the main problems of health and disease, especially in the United States, and how these main problems have changed and are changing;

Methods of measuring and describing health problems as they occur in population groups, including incidence, prevalence, morbidity, and mortality rates.

Methods of comparing health problems among different populations including principles of demographic characterization and adjustment for age and other possible confounding variables.

2. How epidemiology contributes to knowledge of disease etiology:
   Characterization of disease distribution by time, place, and person. Approach to an epidemic of known or unknown etiology. Formulation of hypotheses—descriptive and retrospective. Evaluation of hypotheses.
   Epidemiologic study design—prospective, retrospective, experimental and cross-section, sampling, selection of controls, migrant studies.
   Uses of vital statistics and the selection of study populations. Analysis and interpretation of epidemiologic data—variability, means, deductive inferences, observer error, significance.
   Determination of association and risk factors.
3. How disease is controlled in population groups:
   Intervention in the natural history of disease—vaccine trials and vaccination programs, drug trials.
   Multiple risk intervention.
   Screening techniques.
   Role of epidemiology in evaluation of health care delivery and utilization.
4. How scientific evaluations are made:
   Ability to evaluate the medical literature.
   Ability to evaluate an unusual observation.

B. Specific Terms and Concepts

The following are specific terms that should be included in a comprehensive preventive medicine teaching program:

accuracy
acute
agent: physical, biologic, social
association: direct, indirect, spurious
bias
carrier
case-control
causation: cause and effect
chronic
clinical trial
cohort: birth, current age
communicable infections
contagious: communicable period
contamination
control
controlled study: cross-over study
cross-sectional study
descriptive epidemiology
disease spectrum
distribution
double blind study
efficacy
endemic
environmental: biologic, physical, social
epidemic: common source, progressive
experimental study
fomites
host-agent-environment interaction
immunity: herd immunity
inapparent
incidence
incubation period
index case
inter- and intra-observer variation
International Classification of Diseases
infection
infestation
infectivity
intervention
latent
longitudinal study
morbidity
mortality
natural history of disease
pathogenicity
population
population-at-risk
portal of entry
prevalence: point, period
prevention: primary, secondary, tertiary
precision
precursor
proportionate mortality
prospective study
quarantine
rates: adjusted, crude, specific
recrudescence
reservoir

resistance: inherent, acquired
retrospective study
risk: absolute, attributable, relative
risk factor
seasonal variation
secular trend
sensitivity
screening
specificity
standardized mortality rates
standard populations
susceptibility
target population
transmission: indirect, direct, cyclical
variability
variable: independent, dependent, confounding
vector
vehicle
virulence
zoonoses

Certain of these terms require time and the use of many examples to insure their assimilation. Lectures need to be complemented by group discussion of exercises to reinforce understanding in the use of these terms. Briefly, such exercises include:

Calculation of Rates. Students have to calculate rates by themselves in the context of a problem to understand the principles and the rationale in determining various rates. A classical example is the understanding made available by work on age-adjusted rates.

Types of Studies. Recognition of the differences between cross-sectional, retrospective, prospective, and other types of studies, together with the selection of one to answer a given question, requires a great deal of teaching effort. Cohort analysis, a valuable tool in an investigation, is appreciated by students in lectures supplemented by a problem-solving exercise, as in studies of lung cancer and tuberculosis. Laboratory exercises should be an integral part of an epidemiology course, since they not only supplement the lecture but they point up difficulties in the analysis of data.

In addition to the terms already listed, certain rates and ratios are of particular importance. These include:

age-specific rate
attack rate
case fatality ratio
cause-specific rate
crude rate
disability rate
fertility rate
infant mortality rate
maternal mortality rate
neonatal mortality rate
perinatal mortality rate

C. Specific Disease Areas

1. **Communicable Infectious Diseases.** Analysis of communicable infectious disease remains a marvelously effective way to teach the basic principles, concepts, and analytic procedures. We have found the exercises distributed by Dr. Milton Terris of New York Medical College, Department of Community and Preventive Medicine, to be of great value in teaching epidemiologic principles that relate to communicable diseases.

2. **Specific Diseases.** Hypertension; tuberculosis; carcinoma of the stomach, bowel, breast, and lung; venereal diseases; hepatitis; coronary artery disease; mental illness.

These have been chosen because they are important, occur frequently, and, with the possible exception of breast and stomach cancer, can be prevented or controlled at least to some extent. Carcinoma of the stomach and carcinoma of the bowel appear particularly important because of the intriguing incidence trends of the former and the extreme geographic variation in incidence of the latter. Through rapidly expanding research on the potential role of toxins, fecal flora, and diet, students may better understand the epidemiologic behavior of these tumors and the possible role of the various risk factors.

The case example of carcinoma of the lung provides not only an opportunity to analyze some classic epidemiologic studies, but also to demonstrate the distinction of association from causation. It provides an opportunity to look at an important problem from a multifactorial point of view, i.e., the influence of tobacco, viruses, aflatoxins, trace metals, and air pollution, among others.

The epidemiology of tuberculosis remains of enormous interest, both in regard to its diminishing incidence in the United States, the international pattern, the relation of epidemiologic data to reinfection concepts, and the proposed new attack in the

United States on the reservoirs of tuberculosis infection.

Currently, the venereal diseases and hepatitis are two of the most important sets of epidemic diseases in the United States. Salmonella infection offers not only an opportunity to look carefully at common source epidemics, but to focus as well on what is really needed to render foodstuffs and liquids noninfectious. Our students know far too little about the mechanics of food contamination and decontamination.

The prevalence of hypertension and coronary artery disease, the ability to intervene in the former by secondary prevention and in the latter by efforts at control of risk factors make these crucial components of any preventive medicine curriculum.

Mental illness is all too rarely taught from the epidemiologic point of view and, more than any other form of disease, it is considered as a one-on-one doctor to patient entity. This, clearly, is shortsighted. There are differences in rates in various areas and definable risk factors; increasingly, data from registries of mental disease are available for teaching purposes.

In many of these areas, specific exercises are available from Dr. Milton Terris that are relevant and helpful.

3. **Accidental Injury, Homicides, and Suicides.** The prevention of injury due to accidents has long been neglected in the medical school curriculum; yet this is the leading cause of death between the ages of 1 and 44 years. Homicides and suicides are not far behind in the age groups of 15–35 years. Students are often quite interested in these areas but, for the most part, faculties are not. There is an increasing interest on the part of epidemiologists in societal problems, and much intriguing demographic and psychosocial data are available for use in student teaching programs.

4. **Use of Illicit Drugs or Promiscuous Utilization of Licit Drugs.** The abuse of alcohol, marijuana, over-the-counter medicaments, and prescription drugs occurs in epidemic proportions in the United States. Many competent epidemiologic studies on the use of illegal mind-altering agents in suburban communities, in high schools, and in colleges have been conducted. Much is known about the reasons for use and nonuse, the changing patterns of involvement, and the interrelationships among drugs. There are far fewer studies on the use of legally obtained tranquilizers, sedatives, and stimulants by housewives, businessmen, and others, but data are accumulating. It is valuable for the student to become informed on these problems. There are, of course, a plethora of studies on alcohol. This intoxicant costs us tens of thousands of lives and an estimated $25 billion in economic loss each year, but the subject is underrepresented in preventive medicine teaching. Even when it is taught, the inclination is to stress clinical manifestations consequent to alcohol abuse rather than risk factors and demographic aspects.

5. **Hospital Epidemiology.** This is becoming a bonafide subspecialty area of its own. The methods used to gather data, the organization of hospital-based teams, and the surveillance of nosocomial infections are an intrinsic part of medicine in the United States today, and the subject should be taught in preventive medicine. The student should be conversant with these problems by the end of the second year and before entering upon clinical clerkship experiences. Many hospitals have appointed hospital epidemiologists who could be called upon to take part in teaching in this area.

6. **Geographic Medicine.** This particular area of preventive medicine becomes more important each year. Marked differences in the rate of stroke in Japan and the United States, or a comparison of United States' coronary artery disease rates with those of other areas of the world are worthy of substantial discussion relating to diagnostic standards and risk factors. The international statistics on cancer are of particular interest. With virtually all the important neoplasms, 6- to 10-fold differences in reported incidences occur around the world. Esophageal cancer in certain mideastern areas occurs with a frightening frequency in comparison to adjacent areas only a few hundred kilometers away. Students appear to be progressively more intrigued with international disease comparisons and their potential meanings for the preventive control of environmental factors.

7. **Occupational Diseases.** There are many lessons to be learned from the preventive medicine experience of those engaged in the work of occupational medicine. Adult populations-at-risk are more accessible for continuing evaluation, and long-term observations are available from pre-employment and periodic examination records. The systematic epidemiological investigation of industrially occurring diseases may, in fact, give early warning of the

potential harm of various substances before this is evident in the community-at-large. The long-term consequence of low level dosages of the new chemicals being manufactured requires evaluation for mutagenic as well as carcinogenic effect. Preventive medicine teaching at present does not exploit or represent adequately the lessons to be learned from the work environment.

8. **Diseases Transmitted from Animals to Humans.** In recent years, the incidence of disease via the animal-to-human route of transmission (zoonotic disease) has been a cause of increasing concern in both rural and urban communities. Whereas agriculturally related and feral animals cause a substantial amount of the zoonoses reported, household pets are not free from potentially pathogenic organisms. Both dogs and cats have been implicated in rabies and larval migrans. Dogs may also harbor the organisms causing leptospirosis and echinococcosis, and cats contribute to cases of toxoplasmosis and cat scratch disease. In addition, birds have been associated with psittacosis, domesticated animals with tularemia, and domesticated turtles, chicks, and ducklings with salmonella infections. Many of these, as well as other animals, serve as reservoir host for arbo (*ar*thropod-*bo*rne) diseases transmittible to man.

The incidence of these diseases depends on the geographical area and presence of the susceptible animal species, the population-at-risk (more children may mean a higher risk), and problems in the institution of control measures: limiting the size of pet populations, ordinances against improper disposal of animal excretions, and immunization practices.

Medical students, as future physicians, need to be informed on procedures for reporting zoonotic and other forms of infectious diseases, and to be aware of the basic epidemiologic principles for their prevention and control.

DEMOGRAPHY

Demography, as the study of population dynamics, has long been part of the foundation on which epidemiology and public health rest. It is imperative that students understand one of its fields of study, vital statistics, and learn the techniques for describing and analyzing data.

Vital statistics offer an incomparable method for understanding public health issues and for placing them in proper perspective. They provide the key to the better understanding of international health issues. It would be a pity if medical students are not given a proper grounding in this area.

Historically, population issues have been, and still are, filled with controversy. Physicians have become involved increasingly with one of these problems, namely, the matter of population control. Indeed, this may prove to be the single most important problem that society will have to face during the next 50–100 years.

From the medical perspective, one can consider family planning as a kind of personal, preventive health service; and, more recently, the profession has begun to think of family planning in terms of the health of the family unit as well. This extends the horizon to include the wider societal arena of population, since family and personal health are inextricably related to societal health. Furthermore, in recent years, increasing attention to the role of environmental pressures on the health of individuals is tacit reflection of general acceptance of the notion of the multiple causation of disease. In medical education, population pressures (density, overcrowding, etc.) are recognized as etiologic in ill health, and they rank as a legitimate concern of medicine—particularly preventive medicine.

Another reason for including the subject of population in the medical school curriculum has to do with the concept that physicians, as a group, are among the opinion leaders in society, and, as such, they have an educational and perhaps a responsible political role to play in the development of broad, societal policies in areas such as pollution and population. For the reasons above, it would seem most appropriate to include a discussion of these issues in any course in preventive medicine. It would, after all, be catastrophic for students to graduate from medical school without formal exposure to population dynamics and population problems. But there are a number of more pragmatic reasons why population education should be included in the curriculum:

1. Population change (barring dramatic alterations in death rates) is ultimately the result of many, many individual, reproductive decisions. Obviously, physicians are in a critical position vis-a-vis influencing these decisions because their opinions are actively solicited. Therefore, they must

be conversant enough with the data to provide accurate answers and knowledgeable advice.

2. A related factor involves the reality that physicians largely control the most effective methods for family planning, and thus physicians are crucial to implementation of the objectives of their patients and broader cultural and societal objectives. These include, of course, not only the oral contraceptives and intrauterine devices, but abortion and sterilization as well. This being the case, appropriate education for physicians in the basic underlying issues is clearly of critical importance.

An outline of topics for inclusion in the curriculum might include the following:

A. The problem of the scientific study of population.
  1. A descriptive discipline.
  2. Controversies over the laws of population dynamics.
B. Definitions and explanation of rudiments of population dynamics.
  1. Birth, death, and fertility rates.
  2. Rate of natural increase (growth rate).
    a. Emphasis on the fact that seemingly low percentage change in rates can ultimately have profound effects.
    b. Illustrations of growth rates and doubling times.
  3. Understanding why birth rates can decrease yet the population continues to increase.
    a. Concept of zero population growth and net reproduction rates.
C. The Malthusian doctrine of population dynamics.
D. Some representative statistics to illustrate the magnitude and severity of the problem of population growth.
  1. United States.
  2. Other countries.
E. Health implications of population control for society.
  1. Cost of unwanted pregnancies.
  2. Cost effective and cost beneficial issues of population planning.
  3. Overcrowding and stress reactions.
    a. Controlled animal studies.
    b. The natural experiment—the lemmings.
    c. Parallels and possible extrapolations to humans.
F. Concepts and issues relating to population planning.
  1. Voluntarism—will it do the job?
  2. Other incentives and disincentives.
    a. Governmental pro- and anti-natalist policies.
    b. Taxation.
    c. Other.
G. Religious and ethical considerations.
  1. Current status.
  2. The genocide issue.
    a. National fertility studies—desired family size.
H. The current scene.
  1. Legal issues.
  2. Legislation
  3. Public opinion, trends, and political considerations.

BIOSTATISTICS

Most medical educators recognize the importance of offering some instruction in biostatistics to medical students. However, the quality and quantity of biostatistics instruction varies markedly among medical schools, and decisions as to course content, number of instruction hours, and course format frequently are determined by the interests, motivation, and training of a small number of concerned faculty at each institution, and their ability to influence policy on core curriculum content.

This overview represents an attempt to place in perspective the role of biostatistics in the medical curriculum and to provide some objective guidelines for teaching the subject.

Current Status

In 1969, steps were taken within the American Statistical Association to establish a mechanism for exchanging information among teachers of biostatistics in medical schools on how best to deal with the problems of student motivation, limited class time, core curricula, and changing medical school goals. Accordingly, a new subsection on Teaching of Statistics in the Health Sciences was formally approved at the 1970 meeting of the American Statistical Association.

Since a survey of biostatistics curricula in medical schools was last conducted by Hopkins in 1957, a first task was to initiate a more up-to-date survey (*1*). Of the 109 schools responding, 55 (50.5 percent) offered a separate required course in biostatistics. Another 21 schools (19 percent) required some exposure to biostatistics as part of some other course or on a self-learning basis. Therefore, some biostatistics training was required of all students in 70 percent of the participating medical schools, representing a decrease from the 83 percent figure reported in 1957 (*3*). Biostatistics was offered as an elective course in 18 schools (16 percent) and no formal training in biostatistics was provided in 15 schools (14 percent). Among 66 schools with required instruction, the median time per course was 21 hours. Sixteen of these schools (24 percent) offered less than 15 hours, and 4 (6 percent) required less than 10 hours of biostatistics instruction.

Although the median required exposure time increased from 17 hours in 1957 to 21 hours in 1969–70, the proportion of schools offering no formal biostatistics instruction was virtually unchanged during this time period (15 to 14 percent). Moreover, of 45 schools that were offering a required course in biostatistics in 1964–65 as well as in 1969–70, 11 (24 percent) were allotting less time to the course in 1969–70. While the majority of the medical schools had apparently upgraded their biostatistics curriculum, the 1969–70 survey revealed that approximately one-third of the participating schools offered little or no formal required instruction in biostatistics.

Justification for Teaching Biostatistics in Medical School

A substantial minority of medical school educators, and a considerable number of medical students appear unconvinced of the importance of medical students receiving required instruction in biostatistics. Medical students, who tend to give highest priority to subject matter covered on the National Board licensing examinations, have long been aware that biostatistics questions were rarely included in Part I (Basic Sciences), and have generally constituted no more than 15 percent of the questions in the public health and preventive medicine segment in Part II of the examinations. Why then, they ask, should they be required to devote time to learning biostatistics at the expense of other seemingly more "relevant" subjects? Since 1973, however, statistical questions have been included as a regular feature of the behavioral sciences component of Part I of the National Board examination, and this is bound to have an impact on the need to prepare students appropriately.

While it is important to prepare students in subject matter covered on the National Board examinations, the inclusion of biostatistics in the medical school core curriculum is justified on far stronger grounds than this. Introduction to this discipline will help the future physician:

1. To more critically assess the medical literature.
2. To gain insight into biological variability and the range of "normal" as they relate to clinical decisions and the evaluation of laboratory results.
3. To understand the nature of experimental trials and success or failure of different prophylactic and therapeutic regimens.
4. To be able to participate actively and contribute as a member of a research team.

While in school, medical students are taught the best methods of diagnosis and therapy. After graduation, they must depend on current literature to learn new methods and must be able to evaluate for themselves the results of the work of others.

The growing emphasis on the role of quantitative methods in medicine makes it imperative that medical students acquire some knowledge of basic statistical concepts so that they can critically assess the statistical findings in a technical article. A recent survey by Feinstein (*2*) of statistical procedures appearing in five general medical periodicals disclosed that a reader of the scientific sections of such literature can expect to find statistical procedures in about one-third of the papers. To compound the problem, a statistical evaluation of 10 frequently read and highly regarded medical journals, conducted by Schor and Karten in 1964 (*6*), revealed that in almost three-fourths of the reports read, the conclusions drawn were invalid in terms of the design of the experiment, the type of analysis performed, or the applicability of the statistical tests used or not used. Although the more reputable medical journals have vastly improved their statistical screening procedures during the past decade, invalid studies still appear regularly in the medical literature. Therefore, modern physicians need to understand statistical principles so that they can critically appraise research reports. In addition, statistical training contributes to an understanding of the concept of normal variation, which is essential for evaluating laboratory test results. Moreover, by learning how to collect, analyze, and interpret data and to arrive at proper conclusions, future physicians will be in a better position to assess the limitations of their own clinical experience, to participate in group research, to recognize when circumstances warrant the application of statistical methods, and to realize when to seek statistical help at a higher level.

How Biostatistics is Being Taught in Medical School

In 1969–70, most schools (62.5 percent) were teaching biostatistics exclusively by means of the traditional classroom lecture approach, often supplemented by numerical problems, discussion periods for questions, critical review of the literature, and in-class quizzes. Recently, some schools have experimented with less traditional methods. At the McMaster University Medical School, slide tape shows, video tapes, and a series of handouts are used almost exclusively in place of formal lectures. At the University of Iowa College of Medicine, a programmed self-instructional manual is employed to present biostatistics material to medical students. At the Medical College of Pennsylvania, the biostatistics course evolved from a series of nine 2-hour sessions, each comprised of a lecture hour and a small group-conference hour, to a lecture-free format utilizing a self-instructional text supplemented by weekly small group-conferences and short quizzes.

One of the major problems confronting the biostatistics instructor in medical schools is the diverse background, capabilities, and interest displayed by the incoming students. In 1969–70, more than one-half of the schools requiring biostatistics exposure made no provision for exemption of students from the biostatistics requirement on the basis of previous preparation or performance on a qualifying examination. Approximately one of ten schools requiring biostatistics exposure were offering alternative courses for students with differing backgrounds. For example, students attending Harvard Medical School had the option of selecting one of three biostatistics courses differing in method, viewpoint, and emphasis. Most students opted for a basic course in introductory biostatistics which emphasized basic statistical principles and was designed for the future practicing physician. A second course presented biostatistical material from a more mathematical point of view. The third option was intended mainly for the future physician who would be involved in clinical research or laboratory experiments.

There is no accepted best method of teaching biostatistics. Courses have to be designed to meet the needs of students and the resources of each medical school. Because incoming students differ in their prior exposure to statistical methodology, interest is growing in self-instructional methods, such as programmed instruction texts and computer-assisted instruction (CAI), which allow the student to proceed at his or her own pace.

In the 1969–70 survey (*1*), the individual assuming major responsibility for biostatistics instruction in the 72 schools requiring exposure can be characterized generally as a male between 30 and 49 years of age, with a doctoral degree, employed on a full-time basis by the medical school at the rank of associate professor or higher, one who has had his principal formal graduate training in a department of statistics or in the biostatistics department of a school of public health, and who considers himself to be primarily a biostatistician, biometrician, or biomathematician. In 1969–70, the vast majority of the responsible instructors were professional statisticians whereas, in 1957, the majority of biostatistics instructors did not consider themselves to be primarily statisticians.

What Biostatistics Topics are Being Taught in Medical School

In the absence of firm guidelines and standards, the individual who assumes responsibility for teaching biostatistics to medical students is called upon to make a subjective determination of what to include in the biostatistics curriculum, within the constraint of the time allotted for the course. According to the 1969–70 inventory (*1*) at least one-half of the medical schools that required biostatistics exposure gave major emphasis to the following topics:

1. Frequency distributions, tables, graphs
2. Measures of central tendency
3. Measures of variability
4. The concept of probability distributions
5. The normal distribution

6. Sampling distribution of means, central-limit theorem
7. Confidence limits
8. The *t*-distribution
9. Principles of tests of significance
10. *t*-tests for comparison of two groups
11. Chi-square test for comparison of two independent proportions
12. Medical experimentation: clinical trials, randomization, etc.
13. Fallacies and pitfalls in numerical reasoning: common sources of bias or selection in medical studies
14. The scientific method

These 14 topics could easily constitute an acceptable basic minimum curriculum in biostatistics. A comprehension of these subjects should provide sufficient understanding of general statistical concepts to prepare students for the National Board examinations and to enable them to cope with the bulk of the statistical issues in the medical literature. Indeed, Feinstein's survey of five major medical journals (*2*) showed that "a physician who comprehends standard deviations, standard errors, *t*-tests and chi-square tests will be ready for about three-fourths of the statistical procedures that confront him." If the time allotted to the course in biostatistics is insufficient to cover statistical applications in detail, emphasis should be placed on the principles of tests of significance and the basic assumptions underlying statistical tests, while limiting the discussion to one or two illustrative tests of significance. A physician scanning the medical literature does not necessarily have to know how to apply a statistical test, but he should know how to interpret the results of a reported test.

According to the 1969–70 inventory, the following topics were given at least minor emphasis in a majority of the required biostatistics programs, and they merit strong consideration for inclusion in the curriculum if time permits:

1. Elementary probability: additive and multiplicative laws
2. Use of binomial distribution
3. Simple linear regression and/or correlation
4. Chi-square and contingency tables beyond the 2 × 2
5. Chi-square goodness-of-fit test
6. Nonparametric tests for comparisons of two groups
7. Vital statistics rates and ratios, rate adjustment, population life tables
8. Medical surveys, retrospective, prospective, and cross-sectional studies.

The last two topics frequently are offered elsewhere in the medical curriculum, generally in a course in epidemiology.

A more comprehenisve and detailed proposal for a core curriculum in medical biostatistics was recently reported by a committee of the American Statistical Association's Subsection on Teaching of Statistics in Health Sciences (*5*). This curriculum suggested additional topics such as scales of measurement, sensitivity and specificity of a diagnostic test, conditional probability, nonparametric measures of correlation, and some topics in multivariate analysis.

When Biostatistics is Being Taught in Medical School

The 1969–70 inventory of medical schools revealed that of 54 responding schools that gave a separate required course in biostatistics, 76 percent offered the course in the first year and 20 percent offered the course during the second year. Obviously, the great majority favored introduction to biostatistics early in the medical curriculum, since knowledge of probability and statistical principles are essential to solving problems in such fields as epidemiology, human genetics, pharmacology, and clinical pathology. Moreover, a basic statistical foundation is necessary to cope with and to appraise the medical literature. The basic foundation in biostatistical principles offered in the first 2 years of the basic science curriculum should be reinforced and extended by representation and application in other basic science courses and in the clinical programs as well.

Recommendations

Progress has been made in biostatistics instruction in American and Canadian medical schools, but much remains to be done. This discipline will not assume its appropriate role in medical education until the following recommendations are implemented:

1. The satisfactory completion of a basic course in biostatistics should be mandatory for graduation from medical school.

2. Each medical student should be introduced to at least 20 hours of biostatistics instruction with reinforcement in the basic sciences and the clinical subjects.

3. The continuing development of innovative self-teaching techniques should be encouraged either to supplement, or to replace, the traditional lecture approach to teaching biostatistics.

4. Biostatistics instruction should be included in continuing education programs to provide practicing physicians with the basic biostatistical understanding required for them to cope with the current medical literature.

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9

REFLECTIONS ON TEACHING EPIDEMIOLOGY TO MEDICAL STUDENTS

Elizabeth Barrett-Connor

In the fall of 1965, I joined the faculty of the University of Miami School of Medicine. At that time I was assigned primary responsibility for the teaching of a required course in epidemiology to second-year medical students. The acquisition of this course could hardly have been considered a prize; in fact, I was led to believe that the teaching of it served as a necessary penance for a faculty appointment to a person without laboratory skills or inclinations. My experience and qualifications for such an assignment were limited. I had felt the strong and positive influence of the public health courses at Cornell University Medical College, largely under the auspices of Dr. Walsh McDermott, had a general background in infectious diseases and their associated epidemiology, and, while at the London School of Hygiene and Tropical Medicine, had attended all of the courses required for the doctor of public health in the tropics diploma (which included biostatistics). I also was the happy recipient of the teaching problems and instructor's guides distributed by Dr. Milton Terris.

It was my intention to teach the course primarily as a technique in problem-solving and the methodology of data collection. To this end I hoped to achieve considerable student-teacher interchange as opposed to more didactic lecturing characteristic of other courses given in the first 2 years of medical school. Subjects were arranged in order of increasing epidemiologic complexity, e.g., from food poisoning to tuberculosis to chronic diseases. The subject matter was selected as examples of classic epidemiologic investigation or examples of diseases of public health import which were inadequately covered in the remainder of the medical school curriculum. Thirty-three 2-hour sessions were scheduled to permit the detailed discussion of protocols which the students had studied prior to class.

Because of class size (110 students) and limited faculty (me), it was not possible to divide the class into small sections to improve interchange. Therefore, it was originally elected to require the students to hand in the answers to the problems for my review. Because this proved to be incredibly time-consuming, and because the students were in fact solving the problems in groups and turning in duplicates of the answers, the second year the format was changed so that students were allowed to hand in their problems in groups of up to four. As my clinical and research activities increased, this again proved to be too great an onus and, after that year, no further requirement for the handing in of answers was made. In order to assure, however, that the problems had been attempted prior to class, the students were given an unannounced quiz approximately once a month which consisted of answering one or two randomly selected questions from the assigned epidemiology problem.

It soon became apparent that the teaching problems provided by Dr. Terris and his group were not suited to the medical student population with which I was dealing. As a result most of the problems were reworked extensively; for example, where several pages had been devoted to presenting increasing bits of demographic information, whenever possible this was compiled into a large table which indicated age, sex, race specific, and secular trends in one place, which the student was then expected to analyze. In this way some of the original problems were greatly altered. Others were designed completely anew from reviews of the medical literature. In addition, most protocols included problems related to the definition of disease for epidemiologic study and therefore included clinical generalizations. This approach proved useful since these medical students had had very little exposure to clinical medicine and were therefore extremely anxious to learn anything they could about diseases, even when it was necessary to learn the distribution of diseases in order to obtain this information.

This course differed in design and structure from any other course offered in the first 2 years of medical school in that, for the first time, the students were not presented with a digested body of facts but were asked to do some thinking and make their own interpretations. The students were given a final examination at the end of each year in an effort to evaluate the efficacy of this teaching method. Problems in evaluating learning are maximized when the course material is designed to present methodology rather than didactic information, and it was not always possible to correlate examination results with progress indicated by class participation. Therefore, it proved extremely difficult to evaluate the course. Response to the course, however, as monitored by an annual request for, criticism and comment sheet to be turned in anonymously at the end of the year, revealed that over 80 percent of the class were enthusiastic about the course content and presentation. Indeed, it was general scuttlebutt on campus that the epidemiology course had changed from being the least desirable of all courses taught in the first 2 years to one of the most popular. Popularity, of course, is not necessarily an index of effectiveness but then neither is it possible to be highly effective in a situation which is extremely unpleasant.

In January 1970, I joined the faculty of the University of California in San Diego (UCSD) and immediately undertook major responsibility for the teaching of epidemiology to second-year medical students. This course differs from that offered at the University of Miami in that the number of hours and the number of students are halved. In addition, the course is integrated with pathology and microbiology. For example, lung pathology and pulmonary infection are taught concurrently with epidemiology of lung cancer, air pollution, and tuberculosis. In order to meet these general curriculum commitments it has been more difficult to proceed from the more simple to the more complex, i.e., from infectious disease to chronic disease epidemiology. For this reason, and because the teaching of infectious disease epidemiology in the microbiology curriculum was in general very good, increasing emphasis has been placed on the epidemiologic analysis of chronic diseases.

Initially the class format was very similar to that at the University of Miami, i.e., 2-hour sessions. Recently, because the smaller class size allows greater participation, it has been possible to nearly double the subject material and preserve the Socratic approach in 1-hour sessions. The 1-hour format also facilitates integration of subject matter with that taught in pathology-microbiology. Because the number of medical students admitted is increasing annually (52 this year, 65 for next year), some change in format will be necessary in order to preserve the teaching method. Consideration is now being given to dividing the class into at least two groups for some of the sessions in order to promote interchange.

The topics, as before, have been selected to demonstrate classic epidemiologic principles and pitfalls or to consider public health problems amenable to epidemiologic investigation and are not adequately covered elsewhere in the curriculum, e.g., accidents and air pollution. The addition of open-ended, i.e., unsolved, epidemiologic problems of current interest are those in which student participation (and presumably learning) is maximal. Thus, of 36 lectures currently given at least half have major unresolved epidemiologic questions and 6 are sufficiently topical to be covered in the local press. In the latter category we have had exciting sessions on topics including vitamin C and colds, BCG and leukemia, abortion rates and risk factors, oral contraception and stroke, the risk of prematurity in anesthesiologists, and hexachlorophene and hospital-acquired infection in the newborn nursery.

Another change which has evolved in recent years is an increasing emphasis on reading original medical literature rather than the use of protocols. At the present time over one-third of the problem solving prior to class involves analysis of two or three papers on a subject. The students are given either a good and bad paper for discussion, or papers presenting conflicting results, or papers with sufficiently interesting preliminary results that the class can discuss methodology for a definitive study. This approach seems more relevant to the general needs and interests of all medical students who will, hopefully, be reading the medical literature the rest of their lives. They are now much more enlightened readers of the methodology section of manuscripts and are no longer surprised to find that the summary sometimes bears little relation to the tabulated results even when the data are published in prestigious journals.

It is my conviction that the success of this effort depends to a large extent on the teaching abilities and interests of the participants. The constant updating of material and changing of topics obviously requires a considerable amount of effort on the part of the teacher and necessarily, therefore, more than minimal enthusiasm for the project.

Ideally, one person should have total responsibility for the course and should give as many of the lectures as feasible so as to avoid repetition of some concepts and exclusion of others. In the current UCSD course, I give half of the lectures and have been fortunate in having good support from the local faculty as well as "visiting celebrities" to present other materials.

The major defect of the course remains: there are some students who are refractory to the concept that they should invest time in attempting to resolve questions as opposed to reading "the facts" from a textbook. In my experience some 10 to 15 percent of students are never swayed to the Socratic method and will never find satisfaction in the pursuit of epidemiologic problems. After nearly 10 years of agonizing over such students, I have finally decided to aim the course at those students who can be "turned on" and not to allow myself to become too paranoid about the remainder.

It is difficult to know how to evaluate the course. Examinations with "yes" or "no" type answers may demonstrate attendance in class but do not necessarily demonstrate a working familiarity with the necessary thought processes for epidemiology. An examination based on a specific epidemiology problem is not entirely satisfactory either in that students who have gained the most from the course as a whole may find themselves totally at sea for a given problem, whereas given another problem they may achieve remarkably astute conclusions. Furthermore, at UCSD, examinations in general are frowned upon and the number of teaching hours provided for this course are too limited to allow for multiple testings. Therefore, the only hard criteria for the success of this course must be based on another examination, Part II of National Boards, which is required for all UCSD medical students. I am totally unfamiliar with the questions asked in the public health section of this examination and have deliberately remained so, not wishing such information to bias what I consider to be my teaching priorities. Nevertheless, both of the classes thus far graduated from UCSD have scored higher in the public health section of the National Boards than in any other section. Whether or not such results bear any relationship to their future ability as physicians, researchers, or readers of the medical literature is, of course, unknown.

Perhaps the most positive thing I can say about teaching epidemiology in this way is that it is fun. While it may be thought by some that "fun" is irrelevant, I believe that a fundamental appeal of epidemiology is its appeal to the puzzle-solving proclivities of man. The potential application of preventive or modifying factors as identified by epidemiologic study, before the laboratory resolution of these problems, raises the level of "game playing" to one appropriate for serious consideration by all future physicians.

Attached to these reminiscences is an abbreviated list of the major concepts hopefully covered in the epidemiology course as well as the subject matter and related references.

MAJOR PRINCIPLES STRESSED IN UCSD EPIDEMIOLOGY COURSE

1. Vital statistics; their use and limitations
2. Definitions and methodology; rates, risks, prospective, retrospective, case, cohort, descriptive, analytical, and experimental epidemiology
3. Statistical inferences based on study design; causal association
4. Definition and classification of disease
5. Definition of and approach to an epidemic
6. Risk factors, multifactorial etiology, and ultivariant analysis
7. Genetic vs. environmental studies; twin, adoption, and migration techniques
8. Clinical drug trials
9. Screening techniques and priorities
10. Medical ethics of experimental epidemiology
11. Application of epidemiology to health planning
12. Ability to evaluate the medical literature
13. Ability to evaluate an unusual observation
14. Study design

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10

LEARNING CLINICAL EPIDEMIOLOGY AND BIOSTATISTICS IN A FORMALLY INTEGRATED MEDICAL CURRICULUM

David L. Sackett

Mrs. Bruce, a 70-year-old, retired geography teacher, moved back to her home town following her husband's death three years ago to live with a younger sister (also a widow). You first saw her 2 years ago for the complaint of "smothering" sensations which would awaken her from a sound sleep and cause her to sit up before an open window in order to catch her breath. At that time you obtained a history of "scarlet fever" at age 10, a heart "leakage" noted at a retirement physical, and some ankle swelling at the end of the day. Physical findings at that time included a loud, decrescendo diastolic murmur heard along the left sternal border, a wide pulse pressure, and a prominent apex beat in the left 5th intercostal space at the anterior axillary line.

Her episodes of "smothering" disappeared with digitalis, and you have not heard from Mrs. Bruce for over six months. However, when you come to your office this Monday, you find the following note from the colleague with whom you share weekend coverage of your two separate solo practices:

> *Called to see Mrs. Bruce Sunday morning for dyspnea. Feeling 'lousy' for the last week, and said you had given her digitalis for a 'leaky heart.' I think her failure has been slowly getting worse over several weeks, and she also seems pretty depressed. I upped her digoxin (can't be sure she was taking it) and gave her some Diuril. You had better call her sister (they are both scared and a bit befuddled, I think) if she doesn't call Monday morning. My findings:*
>
> *(1) BP 160/60*
> *(2) P 120, fibrillating*
> *(3) huge heart*
> *(4) high pitched grade III/4 pan-diastolic decrescendo murmur heard best in the 4th left interspace right next to the sternum, with radiation toward the apex*
> *(5) rales at both bases*
> *(6) small pleural effusion on the left*
> *(7) 2 + pre-tibial edema.*

I. WHAT HAPPENS

This is one of 14 biomedical problems (BMP's) encountered by medical students during the first few weeks of the 2-year and 8-month M.D. Program at McMaster University in Hamilton, Ontario, Canada. These students have satisfied admission criteria (> 18 years old, > 3 years of some sort of postsecondary education, > a "B" average in the year prior to application) and have been selected into a class of 80 students on the basis of personal letters, an interview (with a medical student, a faculty member, and a member of the community), and their performance in a "mock" tutorial. The resulting class is heterogeneous with regard to age (18–38), sex (44 percent of next fall's class are women), prior experiences, and former academic training (many have had no previous exposure to cell biology or behavioral science).

The McMaster M.D. Program has no courses and the "unit" of education is the BMP (usually on paper, but frequently in the form of a real patient), confronted and solved in a tutorial group of five students and a tutor that meets perhaps twice weekly, the intervening time being spent in group or individual study, visits to appropriate clinical or community settings, small group sessions with resource people, etc. The life of a given tutorial group is approximately 10 weeks.

II. WHY IT HAPPENS

The BMP appearing at the start of this chapter is an example of the vehicle used in Phase I (which runs from early September to mid-November of the first year) in an effort to achieve the following goals:

(1) To be introduced to the Hamilton Region as a community, as an array of health services personnel and facilities (some of which are organized on a regional basis), and as a locus of health professional education and health research.

(2) To develop competency in the following learning methods:

(a) problem-based learning
(b) self-directed learning
(c) small group tutorial learning
(d) the selective use of learning resources (readings, audiovisual aids, resource people)

(3) By exploring biomedical problems, to understand and integrate universal concepts of human behavior, structure, and function from conception to death.

(4) To begin to develop clinical skills.

(5) To learn to deal with the normal anxieties of medical education and professionalization; to develop a self-awareness of and ability to cope with individual strengths, weaknesses, and emotional reactions.

III. HOW IT HAPPENS

In confronting BMP's, the tutorial groups execute a sequence of learning maneuvers which we have named "biomedical problem-solving," described as follows in the Phase I manual:

Given a description of a patient or other clinical situation, the tutorial group or individual student should carry out the following sequence of activities:

(1) A series of questions, which may be stated in lay terms, will be listed as they arise from the biomedical problem.

(2) These questions will be translated into issues in structure, function, and response to stimuli. In other words, if the question is asked: "Why do older women have a greater likelihood of bearing children with epicanthal folds, single palmar creases, and mental retardation?" one of the issues in human behavior, structure, and function raised is: changes in reproductive cells as women grow old.

(The above activities will usually take place in a tutorial discussion which first considers the biomedical problem; however, the following two steps will almost always occur outside of a tutorial.)

(3) Acting singly or in a group, students will carry out the identification and in-depth study of educational resources which provide information pertinent to the identified issues in human behavior, structure, and function.

(4) The synthesis of this information into a cogent explanation of the clinical situation is, of course, a key step and constitutes one of the major foci for evaluation. This synthesis may occur on an individual basis (and should, at appropriate intervals, be written out for the most helpful evaluation and feedback), or may occur during a tutorial group session.

(5) The development of additional questions, suggestions, and hypothesis for further steps in the evaluation and/or management of the clinical situation follows logically from the synthesis, and underscores the fact that biomedical problems can be pursued in a number of directions and tend not to be "close-ended."

(6) The tutorial group will complete the process of biomedical problem solving by carrying out the evaluation of individual and group performances, of the biomedical problem and the related learning resources, and of the resource sessions.

The Phase I tutorial groups, in the fall of 1973, completed BMP evaluation forms on "Jessie Bruce" and the 13 other biomedical problems (BMP's) by listing issues they considered when solving each problem. The issues considered with "Jessie Bruce" are listed verbatim in Table 1, and provoke three comments. First, this single BMP initiated the consideration of an exceptionally broad array of issues in a wide variety of disciplines. Second, the process of synthesizing the resulting array of information into a cogent written explanation of a single patient led to a great deal of integration. Third, a review of Table 1 reveals a substantial consideration of issues in the realm of "preventive medicine," *particularly in disciplines other than "Clinical Epidemiology and Biostatistics."* Because this latter finding is a source of considerable satisfaction to our department, a historical explanation is in order.

TABLE 1. Verbatim Tutorial Group Reports of Issues Considered in Solving the Biomedical Problem: Jessie Bruce

Behavior: psychological impact of a debilitating disease, depression, senility, dependence, compliance, prejudice versus old people, life changes due to cardiac failure, effects.

Community: availability of homes for the aged and how they function, visiting nurses, hospitals and old people, community resources for old people, systems theory and communities, visits to a geriatrics center.

Aging: physiological and psychological processes of aging, sexual function and aging, effects of aging and retirement, effects of aging on cardiovascular function, biological effects of aging, normal aging in persons over 70.

Pediatrics: acute rheumatic fever.

Clinical Skills: chest exam, how to examine the heart, what information can be gained about the structure and function of the heart by physical exam, how does a physician modify his approach to deal with the elderly patient, heart exam and murmurs and auscultation and blood pressure, as per the green sheet and a little percussion, pulses of the body, basic auscultation of the heart, interview of old people and exam of the CNS, clinical observation of the thorax, heart sound discrimination.

Morphology: structure of heart and lungs, radiology of heart and lungs, gross exam of heart, Aschoff bodies, actin and myosin, adult and fetal circulatory systems, structure and function of old folks, anatomy of capillaries and walls, position of heart in thorax.

Physiology: function of heart, mechanism of aging, function of pump, fluid exchange, sounds, how heart and lungs and circulation work, physiology of contraction, innervation of heart, physiology of failure.

Biochemistry: digitalis, diuretics, effects of various drugs on function of heart and lungs, pharmacology of potassium.

Clinical Epidemiology and Biostatistics: importance and prevalence of heart disease, incidence of heart disease with aging, what can be done with people who won't take their medicine, how can events in early life have later manifestations, incidence of scarlet fever, epidemiology of acute rheumatic fever, variations in clinical measurement.

Humanity/Women: do women live longer than men, management of long widowhood, women's perception of health care (this is an indefinite category), euthanasia

Infectious Disease: what are causes, prognosis, symptoms and treatment of scarlet fever, why are infections more common in childhood, why does the same disease have a different response in different age groups, streptococcal infections, streptococcus and heart valves, sub-acute bacterial endocarditis.

Allied Health Professions: nurse-practitioners, care of old people.

Departments/Special: radiology, cardiopulmonary lab, what are the advantages of a solo versus group practice.

IV. THE DEPARTMENT OF CLINICAL EPIDEMIOLOGY AND BIOSTATISTICS

I was sure that my initial invitation to visit Canada in 1967 and discuss forming a department at this new medical school was either a practical joke or a case of mistaken identity. I was 33, only 7 years out of medical school (4 years of which had been spent in training in internal medicine) and my total experience in preventive medicine consisted of 2 years in the "Yellow Berets" (the Heart Disease Control Program of the USPHS) and a year with Brian MacMahon at Harvard (in which I avoided all of the standard courses in public health). My disinterest in the post and my abundant ignorance in the field were reflected in my responses to two questions raised in that first visit:

> *Question:* What sort of department of social, community, and preventive medicine should be formed at this new medical school?
>
> *Answer:* None. Unless the other departments view specific issues in social, community, and preventive medicine as their responsibility, the school is unlikely to make progress in these areas and should be abandoned.
>
> *Question:* What sort of course should be taught in the sciences of epidemiology and biostatistics?
>
> *Answer:* None. Unless a new school can develop a curriculum which integrates these disciplines with the other basic and clinical sciences, monies set aside for a new schoold would better be spent in increasing the class size of the pre-existing schools. (I concluded with the opinion that epidemiology did not satisfy the definition of a science.)

A dozen or more faculty had already joined the new school. They included an anatomist who ran a drug abuse program and who was performing longitudinal studies of social, as well as physical, growth and development; a surgeon who felt that surgery had little or no effect upon the natural history of cancer; a psychiatrist who was placing most of his faculty in community agencies away from the university; and an experimental pathologist who was leading the amalgamation of a series of competing clinical labs into a single district laboratory program. These seasoned, thoughtful men, led by a brilliant dean, had used logic to arrive at the same answers which I had stumbled upon as a recent consumer of medical education, and they mistook a novice for a sage!

I was quickly challenged to form, not a department of preventive medicine, but a methods group in the disciplines of clinically oriented epidemiology and biostatistics, operations research, and quantitative health economics, to serve as a methodologic resource for a series of interdepartmental programs of education, service, and both basic and applied research. The Department of Clinical Epidemiology and Biostatistics was formed later that same year and the demands of programs have caused it to grow, not to its projected size of three members by 1975, but to its current (1974) faculty of six clinical epidemiologists, five medical statisticians, two operations researchers, and a health economist, plus a staff of about forty. We have had, and are having, enormous fun, and remain convinced that there should be neither a department of social, community, and preventive medicine nor a course in epidemiology and biostatistics. Thus, our pleasure in noting that the medical students relegated issues in preventive medicine to a number of disciplines other than Clinical Epidemiology and Biostatistics, as shown in Table 1.

V. DISCIPLINE GROUPS AND BMP'S

In abandoning discipline- and departmental-based instruction for problem-based learning, care had to be taken to prevent the neglect of relevant concepts and to maintain the interest and involvement of discipline groups in the development of educational resources. This has been achieved through the formal recognition of a series of discipline groups which are often coterminus with departments in the medical school. Other discipline groups, however, have been self-generated and have gained recognition and involvement through constructive criticism of the educational program, coupled with an offer to help.

Discipline groups have been major contributors to Phase I in three ways. First, they have taken a direct role in the drafting and redrafting of BMP's so that the final version is relevant, valid, and leads naturally to the consideration of appropriate issues in their discipline. Second, each discipline submits a list of relevant issues and educational resources for each of the BMP's and this list is available for the tutorial to use in solving each BMP. (These "BMP Guides" are provided in sealed envelopes which can be opened at the tutorial group's discretion; they tend to be used for direction early in the phase, and for evaluation as the phase progresses). Third, discipline groups have developed reading lists, carrousel-tape lectures, a few videotapes, and resource sessions which the students can utilize as they search for information relevant to the issues raised by the BMP's.

VI. HOW THE DEPARTMENT FUNCTIONS IN THE M.D. EDUCATIONAL PROGRAM

In the summer of 1968 I sent a questionnaire to each of the physicians in the local medical society (The Hamilton Academy of Medicine). Two questions were asked:

(1) Was anything you learned in medical school in the areas of epidemiology and biostatistics ever of use to you in caring for your patients?

(2) Can you describe any specific clinical situations in which your application of concepts from epidemiology and biostatistics could really lead to better outcomes for your patients?

The contrasting responses to these two questions was a pleasant surprise. Almost everyone said "no" to the first. However, several physicians returned lengthy and very thoughtful responses to the second question, and these are grouped and summarized in Table 2.

On the basis of these responses, at times broadly interpreted in light of our own clinical experiences and interests, we have taken part in the development of BMP's. (As shown in Table 1, "Jessie Bruce" led to considerations of disease frequency measurements, compliance, natural history, and observer variation). We have held (very rarely now) resource sessions and have developed the educational resources shown in Table 3, plus about 10 more which deal with the clinical epidemiology of specific conditions such as hypertension, suicide, chronic respiratory disease, etc. (these are currently being revised so that they can be made available to other schools).

TABLE 2. Questionnaire Responses from Physician Survey

Clinical Situation	Concept Identified
(1) Patient receiving oral contraceptives; clinician concerned about risk of thromboembolism	How to diagnose causation.
(2) Patient with acute severe infectious disease; clinician concerned about diagnosis	Clinical uses of measures of disease frequency.
(3) Patient with genetic defect; clinician concerned about family counseling	Clinical uses of probability.

TABLE 2—continued

Clinical Situation	Concept Identifed
(4) Patient with vague complaint and extensive lab data; clinician concerned about interpretation of results	Summarizing clinical data; normal values in clinical medicine.
(5) Patient requests annual exam; clinician concerned about validity and yield	Natural history and early diagnosis; compliance with therapeutic regimens.
(6) Patient with a "new" murmur; clinician concerned about whether it was missed on an earlier exam	Variation in clinical measurement.
(8) Clinician reads "clinical" journal; clinician concerned that she/he never sees any of the types of illnesses described therein	Clinical implications of sampling.

TABLE 3. Carrousel-Tape Resources in Clinical Epidemiology and Biostatistics

(1) What (on Earth) is the Department of Clinical Epidemiology and Biostatistics?
(2) A Contemporary Concept of Causation
  Part I: Welcome to the 20th Century
  Part II: How to Diagnose Causation
  Part III: Studies in Causation
(3) Clinical Data
  Part I: Statistics in Medicine and Scales of Measurement
  Part II: Methods of Summarizing Data
(4) Clinical Uses of Probability
  Part I: Jargon
  Part II: Rules for Calculating Probabilities
(5) Clinical Implications of Sampling
  Part I: What is Sampling?
  Part II: What's in a Sample?
  Part III: What's in a Sample (continued . . .)
  Part IV: People, Patients, and Clinical Judgments
(6) Clinical Uses of Measures of Disease Frequency
  Part I: Definition, Measurements, and Interrelationships
  Part II: Observer Variation in the Evaluation of Patients
(7) Components of Variation in Clinical Measurements
  Part I: Jargon and Blood Pressure Measurements
  Part II: Observer Variation in the Evaluation of Patients
(8) Statistical Inference
  Part I: Basic Concepts and Jargon
  Part II: Analysis of Clinical Data
(9) Normal Values in Clinical Medicine
(10) The State of Health in Canada

In addition to the foregoing role as a resource group, individual departmental members serve as tutors in all phases of the program, as student advisors, as clinical preceptors, and as phase chairmen.

VII. RELATIONSHIP TO SERVICE AND RESEARCH PROGRAMS

The formal integration seen in the M.D. Education Program is also a major feature of service and research at McMaster. The department, acting as a methodologic resource, provides expertise in design, measurement, analysis, and evaluation to some 40 research projects per year which originate with members of other departments in health sciences. Many of these research projects concern basic issues in human biology and pathophysiology as well as questions in clinical medicine and health care. A similar service is provided to over 30 projects brought to us each year by health departments, community and social agencies, hospitals, and individual practitioners who are attempting to define or solve problems concerning disease outbreaks, the use of emergency facilities, and the evaluation of clinical and health care. Because the University, the Province, and the Federal Government view this form of interdisciplinary service as an important function of our group, all have been quite generous in providing support for personnel and for the operation of the department. These projects and this interaction also provide an invaluable experience in the "consultant-in-training" portion of our graduate programs in Clinical Epidemiology, Health Care Evaluation Methods, and Medical Statistics.

In addition, research ideas originating within the Department are often undertaken within multidepartmental research programs, each of which have both basic and highly applied concerns. For example, several members of the department are also members of the Cardiovascular/Haemostasis/Thrombosis Program, and it is within this program (and with the extremely valuable comments and critiques of our colleagues from other departments) that we have carried out our studies of atherosclerosis and our randomized clinical trials of platelet-active drugs and of clinical strategies to improve compliance with antihypertensive therapy. Thus, the concepts and function of the M.D. Education Program at McMaster are seen in programs of research and service as well.

VIII. PROBLEMS IN THE FORMALLY INTEGRATED EDUCATIONAL PROGRAM

(1) *Evaluation*, and candid feedback to students, has lagged behind the development of innovative BMP's, programmed patients, computer-based physiologic models, and interdisciplinary resource sessions. In avoiding the preset objective examinations which we feel discourage problem-solving and retard independent learning, we have been slow to come up with suitable alternatives, and this, plus the desire to be loved by one's students and tutors, has often led to the failure to recognize and deal with deficiencies in problem-solving skills.

The increasing use of BMP write-ups, in which a student writes out a synthesis which integrates what has been learned into a cogent explanation of the clinical presentation, has represented a major step toward correcting this deficiency, and we are experimenting with computer-based, self-evaluation programs in a number of areas as well.

(2) *Anxiety*, although we believe it is lower here than in other schools, affects both students and faculty. When the former encounter a gruff clinician or a student from a more traditional school, and when the latter are frustrated in their research or clinical activities, the anxieties arising from anecdotal experiences with deficient student or faculty performance are inclined sometimes to lead to blanket condemnation of students, faculty, and the total program, rather than to rational assessment or, in matters of opinion, a polling of all opinions coupled with an offer to help improve the situation.

If the formally integrated curriculum becomes accepted at other institutions, this problem may lessen; at present, however, considerable energy is expended in dealing with these anxieties and in attempting to harness them into constructive rather than destructive efforts. Program leadership has been excellent, and program changes are increasingly likely to be based upon valid evidence rather than simple exhortation.

(3) *Rigidity* in the "new" approach is also a problem. We run the risk of retaining "new" approaches which are ineffective and rejecting all that is "old," and occasionally one hears the *status quo* defended on no firmer ground than "it is the McMaster philosophy."

This problem is being attacked in two ways. First, we are attempting to increase the validity of our evaluation of the program and its graduates, so that appropriate change can be shown to be imperative, even though it breaks with "tradition." Second, since we established at the outset a system which "fires" deans and departmental chairmen after five and six years, respectively, we force ourselves to return to careers as teachers, clinicians, and investigators and avoid (we hope) a "cult of personality." We believe that these features will maintain an appropriate degree of continuous change in all of the programs, and have found that most of us have much stronger feelings of loyalty to each other than to the programs or the institution.

(4) *Transferability* of the formally integrated M.D. educational program may be very low. It would require the simultaneous generation of a great deal of flexibility on the part of all the departments and resource groups, coupled with the freeing of sufficient time for planning, coordination, and the creation of educational resources. It also requires enormous commitment on the part of students and faculty, and the institutions must reward both groups for their efforts and accomplishments; McMaster is the only medical school I know which awards tenure and promotion on the basis of contributions confined to education. Colleagues at other medical schools are experimenting with variants of this approach, and some are incorporating a few of the "packages" listed in Table III. The question of transferability will be answered by these other institutions.

IX. SUMMARY

It has almost always been fun.

11

STUDY OF HEALTH SERVICES IN A PREVENTIVE MEDICINE CURRICULUM

George G. Reader with the assistance of *Mary E. W. Goss*

Public health and preventive medicine today are and should be seriously concerned with medical care. Health care delivery represents a growing proportion of the health dollar, both in personal expenditures and in government outlays. As tax money goes increasingly into health services, public accountability demands governmental intervention to supervise these expenditures. Society as a whole has made delivery of personal health services a top priority. For all these reasons it is incumbent upon the student of medicine today to become knowledgeable about health service delivery and particularly the growing role of government. To prosper in the practice environment of the future, the physician will have to know what options are available to him as a provider of services; and, as a responsible and informed citizen, he should be prepared to influence change constructively. This chapter outlines what might be covered in a medical undergraduate curriculum in preventive medicine and summarizes some basic principles on the selection of methods of teaching and the basic minimum to be learned.

In order to understand the nature of the United States personal health system, it is desirable to have a background of information about other developed countries as a basis for comparison. It is also essential to have historical perspective on the evolution of health services in North America. The health delivery system of a country is an expression of its social values and attitudes, and necessary to this understanding is recognition of differences between systems in terms of values.

A good deal of information has now been accumulated about delivery of health services as a result of objective study and analysis of organizational variables, utilization, the process of care, and the outcomes of health provider intervention. It is clear, for example, that in developed countries there is not much correlation between the quantity of service and the health of the population. Service, however, may be an end in itself inasmuch as it provides comfort, support, and satisfaction to individuals. In this context it may be viewed from the same frame of reference as other economic goods and services. Through analysis of the health service system certain principles have emerged: some sociological, some psychological, some economic, and some political. The health services are regularly described in the language and idiom peculiar to each and, at this point, one could refer to health services research as the multidisciplinary or interdisciplinary expression of the endeavor to explain how the system works. Epidemiological principles and methods provide descriptive statements about the amount of disease in a community as one way of indicating the need for community health services.

Principles from these disciplines can be applied to developing countries as well as to an industrialized society. Since public health has a world-wide responsibility, its students should have familiarity with the application of principles of medical care to those parts of the world where acute disease still holds first rank. Here epidemiological control principles may in fact be paramount in protection of the public health, and the services provided may be clearly related to such reduction in death and disability as may ensue.

The vast amount of material now available in medical care is too much for the time allotted preventive medicine in the usual undergraduate curriculum of medical schools. Choices must be made; priorities must be set. Medical students recognize the immediate relevance of a tangible science like anatomy to their role as embryo physicians more readily than they do the abstract language and study of the organization of health services. Time is short for presentation of principles of health service organization; the student's attention span is sometimes shorter. Devices to capture their interest, such as introduction of patient-covered discussions, run the risk of preempting the time available for an organized introduction to the subject. A considerable challenge confronts those responsible for transmitting information on health care delivery early in the medical course when all other instruction is biological.

It should, however, be possible to ascertain and define a minimum of knowledge of the subject that students must have. Necessarily this changes from year to year with new legislation and with the development of innovative or modified forms of medical care organization.

SUBJECT AREAS

Range of Health Care Systems: Some Cross-National Comparisons

This subject should begin with explanation of an analytic model that can be applied to all health care systems. The APHA's *Guide to Medical Care Administration* provides one way of examining the elements of a system; *Health Care: Can There be Equity? The United States, Sweden, and England,* provides another. Because Anderson has used an objective approach to compare the United States, Sweden, and Britain, it is useful to consider with him the health systems of those three countries. It may be well to bring in the USSR as well, since it represents a somewhat different model, one more common to Eastern Europe. Other examples may be chosen from a large literature that has been accumulated, but time constraints make it desirable to limit comparisons to two or three countries. On the other hand, interest in the United Kingdom and the British National Health Service is sufficiently high that an entire unit may profitably be devoted to an examination of its genesis, advantages, and deficiencies. This is often done most authentically if a native expert from Britain is available to provide the critique.

Health Care in Developing Countries

Each of the developing countries has problems peculiar to it in terms of geography, types of disease prevalence, and degree of wealth. All have in common inadequacy of resources to deal with hunger in a rapidly growing population as balanced against the need to deliver health services. Most have high infant mortality and high incidence of infectious disease and accidents. As already noted, an epidemiological model of health protection with its stress on sanitation and immunization is more appropriate in dealing with acute infectious diseases than the social organizational approach common to personal health care services in industrialized societies. It is important for the student to learn how to make the best use of scarce resources, as vividly illustrated in working with the governments of developing countries, and in field situations in parts of the world where organized services are not widely available. The appropriate strategy must count on doing without an abundance of physicians and other highly-trained health professionals and with little money. The health care system must be established in such a way that community health aides and other indigenous workers can function effectively under supervision delegated from a few scattered centers where well-trained personnel are based.

Organization of Health Care in the United States

Although a background in health delivery systems elsewhere is important, medical students frequently complain that teachers of preventive medicine are more concerned with the rest of the world than with the United States, or with parts of the country other than the local community of the medical school. Students want to understand the setting of their own future practice before considering health service problems elsewhere. They also want to know how their own medical school and teaching hospital fit into the local system of health care delivery. It is important, therefore, to devote sufficient time and attention to satisfy these students' desires and to use examples drawn from local experience.

Under the setting of health care, attention should first be paid to the goals and values of our society as they relate to health. The health status of the nation, and of the subgroups within it, should be considered, and indicators of unmet needs discussed. The history of the development of health and social services in the United States must receive its due. Components of organized health services include health manpower (types, numbers, and distribution) and health facilities (and their supporting institutions) which together provide both personal and public health services. A third component is the collectivity of consumers, their needs and demands.

The consideration of organization must include the public services, the health care strategy of the federal government and local jurisdictions, as well as the private sector with its multiplicity of providers. These two sectors, public and private, interact in ways that result in a variety of quasiofficial organizational forms. At this point, consideration of the contrast with national systems that are almost wholly public highlights the distinctive features of the United States entrepreneurial type of health care delivery.

Health Manpower in the United States: Is There a Shortage of Physicians?

Becuase of the current debate over the adequacy of the supply of health personnel it is probably desirable to devote one unit of study solely to this question. Students should be given some background for judgment about recruitment needs and personnel projections for the future in relation to the anticipated demands of the population. Simple population ratios do not take into account the diversity of specialization, nor the lack of availability of various types of health personnel because of problems of access, distribution, time off, and retirement. It is useful to address this problem from the point of view of the economist, namely, the methods for judging a shortage, critique of past efforts, and estimates for the future.

Forms of Practice and Payment in the United States: Traditional vs. New Options

Although this topic may be touched upon under organization of health care, it deserves more extensive discussion. Solo, group, and institutional practice need to be examined in detail, and then the various permutations and combinations provided by various payment methods. The growth of the insurance industry, development of prepayment mechanisms, and the influences that form of practice and type of payment have on the quality and quantity of service are all relevant to the choice of practice setting the student will enter. Health maintenance organizations (HMO) are becoming sufficiently important that they may warrant separate treatment; the expectations that are held for them to control costs through prevention should certainly be specified. Whether preventive services in HMO's are truly effective in improving health and reducing utilization, and whether the system of incentives for physicians results in reduction of hospitalization deserve thorough discussion and critique.

Peer Review and Evaluation of Quality of Care

Federal legislation creating Professional Standards Review Organizations has institutionalized the informal peer review traditional to medicine. It is clearly going to become a highly visible part of professional life. The basis for peer review needs to be understood by the medical student both in terms of public accountability for public funds and the traditions of the profession. Utilization review, and its relation to peer review, must be explained since future practitioners will be heavily involved in these activities. Movement to the broader question of evaluation of quality of care brings to the fore the systematic attempts that have been made to measure quality objectively. Students must learn to distinguish between process and outcome measures and to judge the difficulties and shortcomings in the application of each type. If students can be brought to understand the high level of scientific skill required to measure quality objectively, they will gain a new respect for the complexities of health care delivery as well as the difficulty of judging its effectiveness.

Hospital and Ambulatory Care Facilities and Community Medical Care Needs

Because of the students' desire to understand their local setting and to bring a note of reality to abstract discussions of health services, it is useful to describe in some detail the system of the immediate local community most familiar to the students. This is best approached in terms of the needs of the population, and then the various components, and the organization of medical services. Discrepancies between needs met and those that are not met and other purposes that medical care institutions serve will come clearly into focus. The usual setting for a medical school and its teaching hospital is an urban community. Here it is desirable to discuss the development of the hospital system, the various roles of proprietary, voluntary, and municipal or other governmental hospitals, and how they interrelate. Neighborhood health centers, health department activity in supplying personal health services, and the function of the outpatient departments and emergency rooms can be made evident. The huge role of the private sector, the responsibility of the private practitioner, and the distinctions between lay and professional referral systems should indicate the interdependence of the whole pattern of services to the population of the community.

Rural Health

Health service delivery in rural areas poses a special problem. In some instances it may be analogous to that seen in developing countries, where poverty and unemployment are large factors. Discussions of rural health provide an opportunity to bring up the maldistribution of physicians and the reasons for this. The difficulties of recruiting physicians for rural areas, and the methods that have been employed can be reviewed. This is one of the major unresolved problem areas in health care delivery in the United States and it offers an opportunity to interest students both in terms of an academic public health problem and as personal commitment. Mound Bayou, the health center established by OEO in the Mississippi delta, is an example that has been well-described by Geiger and others.

Financing of Health Care

Most medical students have little acquaintance with formal economics, and it is, therefore, desirable that an economist present an introduction to the subject with emphasis on the rising national health budget and its relation to the Gross National Product. How the health dollar is spent and where the funds come from are essential to an understanding of the health delivery system. The concepts of cost-control, cost-effectiveness, and cost-benefit analysis should be presented so that students understand that they have a personal stake in controlling medical care costs and that the public will hold them accountable for the way health funds are allocated and used.

Funding Health Care for the Disadvantaged in the United States: Amendments to the Social Security Act

The federal government now plays such a dominant part in financing health care delivery through the Social Security Administration that students must understand how the Social Security Act and its recent amendments came into being. They should learn the provisions of the Medicare and Medicaid amendments in considerable detail and understand how they are administered. It is important that they see the implementation of the law from the patient's as well as the physician's point of view and in the perspective of society's attempt to meet the needs of the aged and disadvantaged. This review of federal legislation should also serve as an introduction to a discussion of national health insurance.

Proposals for National Health Insurance

One of the aims of a course in delivery of health services should be to lead medical students to a point where they can begin to evaluate objectively the claims and the rationale of the various proposals for national health insurance currently before the Congress. They should understand the various pressures in a democratic society that contribute to one special interest or another, and how, through political compromise, accommodation is eventually reached. It is important that they see that they will have a future responsibility as citizens and informed professionals to support the most effective form of national insurance and to make it work. It may be particularly effective to present some of the differing points of view through a panel discussion with representatives of labor, organized medicine, and the insurance industry present.

Politics of Health Care Planning

The politics of health can be represented in discussions of the process by which laws come into being and are implemented. Politics can also be portrayed in the light of important contemporary movements; the most significant current example is the potential for change inherent in the National Health Planning Resources Act, PL93–641.

The first approach has presumably been touched upon in the discussions of the Medicare and Medicaid amendments to the Social Security Act. Other federal programs, such as those relating to child health, however, should be presented particularly in terms of implementation in local jurisdictions. State and local laws regarding health, and how they function in practice, are also important to a student's understanding of the relation of the political process to actual delivery of services.

The National Health Planning and Resources Act may well become the most pervasive form of government intervention in health delivery as it is implemented and as it becomes recognized as a prerequisite to a national health insurance program.

It places great authority in the office of the Secretary of Health, Education, and Welfare, requires states to set up adequate machinery for controlling the use of health resources, and relies upon grass root decision-making for determination of need in local areas. The formal hospital and medical establishments may not always be an integral part of the system and professionals may have to learn to accommodate to the directives that are issued. Professionals may propose, but the democratic process through elected officials and governmental bureaucrats will dispose. Medical students will need to have a thorough understanding of how this particular system will work and how they will fit themselves into it, both to carry out their professional duties effectively and to influence the results for the common good.

Malpractice

It has been common in the past to give some attention to malpractice so that future physicians would learn to keep out of trouble and avoid lawsuits. Malpractice now, however, has become such a large threat to the practice of medicine itself that students must recognize the problems it poses in terms of lawsuits, insurance, costs of practice, cost of health care, licensing, and professional discipline. The subject is probably best presented by a lawyer who is sympathetic to the medical profession and well-versed in all aspects of malpractice litigation. It might be touched upon during the presentation of quality control, but is too important today to have anything but a full discussion in its own right.

RESOURCES

A bibliography is appended to this chapter, but it should be understood that as a principle, except for articles of historical interest, it is essential in dealing with medical students to provide the most up-to-date references available. With the rapid development of the medical care field, there is a plethora of articles on all aspects of it in the periodical literature. There is no single satisfactory textbook that can be given to students (although a number of texts are available) so that it is important to keep a current file of recent journal articles. Journals to be reviewed regularly include:

American Journal of Public Health
Medical Care
Milbank Memorial Fund Quarterly: Health & Society
New England Journal of Medicine
Lancet
Inquiry
Health Services Research
Journal of Health and Social Behavior
Medical Care Review
Social Security Bulletin

Other sources of current information may be found in the *Medical Care Chartbook* of the University of Michigan, revised every few years. Special issues such as the *Minority Health Chart Book* of the American Public Health Association are useful. The American Medical Association publishes each year the *Profile of Medical Practice and Socioeconomic Issues of Health*. The federal government also provides a vast amount of information on costs, utilization, and facilities and summaries of pending legislation.

SUMMARY

Although methods of teaching deserve a separate chapter, the strategy of making the most out of curricular hours available in teaching health care delivery is worthy of mention. As in other basic science areas, a certain definitive amount of factual knowledge is necessary to an understanding of concepts and principles in health care delivery. Lectures and reading assgnments are fairly efficient ways of communicating facts and ideas. Small, group seminars are better and essential to permit students to react, to see how their fellow students see the same material, and to ask questions. Cultivating student interest in the first year through well-planned lectures and seminars sets the stage to capture those who may be inclined to go into problems of health delivery in depth later on through electives. At that time it may be possible to capitalize on the initial base of factual knowledge by providing real-life experience through patient assignments, participation in rather than observation of health delivery systems, and field trips to programs. Many teachers of preventive medicine, in fact, rely almost entirely on what can be learned in conjunction with the existing programs of patient care wherein the student-physician finds out at first hand that he needs to be able to conceptualize the health delivery system and to infer the principles that govern it. With a prior background in the principles of health care study, this can be successful.

As a minimum, whatever approach is used, all medical students should become acquainted with an appropriate analytic model of the health care delivery system, understand the components of the system in the United States, recognize the interrelationships of various kinds of health professionals, be familiar with the forms of practice and payment in this country, and be knowledgeable about current health legislation. Peer review and quality assurance efforts will affect all students sooner or later in their professional careers, and they need to find out how they will fit into and be able to influence the health delivery systems of which they are a part.

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12

TEACHING COMMUNITY MEDICINE BY CLERKSHIP[1]

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As a new faculty of community medicine at the "new"[2] Mount Sinai School of Medicine (Columbia University, New York), we are engaged in the lively process of implementing the medical school's commitment to prepare students for an active role in improving the health status of the community. This commitment, expressed in the original credo of the school (*1*), led to establishment of a Department of Community Medicine along with the basic science departments as essential components for converting a traditional voluntary hospital, noted for its clinical excellence, into a future-oriented educational institution.

Pressures to open the medical school to students as early as possible dictated the necessity for the founding fathers of the school (mostly chairmen of Mount Sinai Hospital's clinical departments) to designate the place and role of community medicine in the overall undergraduate curriculum in the absence of a permanent chairman of the department and of most of the present community medicine faculty. In their search for a model to guide them in their task, they were attracted to the University of Kentucky, whose new program of community medicine, initiated in the 1960s as an integral part of the new University of Kentucky medical school, seemed to represent the successful joining of clinical and community medicine that was most congruent with the Mount Sinai concept (*2*). In emulation of the Kentucky experience (*3,4*), a required 6-week rotation in community medicine during the clinical years was incorporated in the original Mount Sinai curriculum design. When Dr. Kurt Deuschle left the University of Kentucky in 1968 to become the permanent chairman of Mount Sinai's Department of Community Medicine, further impetus—and possibility—was given to the idea of adapting the Kentucky model to the urban setting.

Under Dr. Deuschle's leadership, those of us who were given major responsibility for effecting the transplant of an educational program that had flourished in rural Kentucky to East Harlem, Mount Sinai's target community base, quickly became aware of the ways in which differences in sponsorship, environment, and educational and practice climate influence educational planning and implementation (*5*).

In contrast to Kentucky, a public school with the explicit goal of producing family and/or primary physicians to serve the population of the state, Mount Sinai, as a private medical school, derived its definition of purpose from the tradition of clinical science excellence on which it had gained its leadership position as a hospital. While acknowledging the obligation of contemporary medical education to concern itself with the enhancement of community health, it tended to equate the meeting of this obligation with the production of leaders in academic and specialty medicine, rather than with the production of "front-line troops." Both its faculty and student selection thus represented an academically oriented group of learners and teachers with a deep commitment to the advancement of medical science and technology. Liberal in their political and social orientation, they were sensitive to the need to redress the social inequities and deprivation so vividly exemplified in the ghetto community adjacent to the hospital, but they were uncertain as to whether the physician should—or could—act as an agent of social change. Thus, while we found some sympathetic response among our faculty colleagues to our own fundamental belief in medical education as an instrument of social change, we early recognized that the prevailing role model in the full-time faculty was that of the clinical scientist; his counterpart among the attending staff, to whom much of the clinical teaching was entrusted, was the clinical specialist in fee-for-service practice. The medical school thus could not provide the primary or general practitioner on which the Kentucky clerkship plan had so heavily relied for tutorial guidance.

The situation in the surrounding community also differed markedly from Kentucky. While Kentucky had early identified the county and its health care organization as the geographic and institutional components for its field laboratories, we initially had difficulty in identifying their counterparts in our adjacent community of East Harlem. Instead, East Harlem began to emerge from our early surveys as a series of communities, varying in social, ethnic, and cultural characteristics from block to block, and with intense rivalries among blacks and Puerto Ricans for political power and control. The health care system exemplified the "non-system" in its fullest flowering. The sickness needs of the population were met on a fragmented, discontinuous basis by the several hospitals and clinics located in the community. Preventive care was provided through public health stations scattered throughout the area. Their emphasis was primarily on venereal disease control and well-child care—principally immunization (6).

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[1] The teaching program in Community Medicine is partially supported by a grant from the Public Health Service (No. 1 DO4 AH 00941–01).

[2] Mount Sinai admitted its first class in September 1968.

Beyond the lack of comprehensive care models and the social and psychological barriers that existed between the health care providers (for the most part white and middle class), and the nonwhite, socially and economically deprived health care consumers, the threats to personal safety and security inherent in inner city life posed additional obstacles to making East Harlem the laboratory for community medicine teaching.

All of these factors forced us to look beneath the actual learning experiences provided in the Kentucky community medicine clerkship to the principles that had governed their selection. Here, we early identified: (a) getting our sense of direction from a partnership with the consumers of health services; (b) learning as much as possible about the needs, resources, and priorities of the people from the people; (c) joining our resources with existing or potential community resources as transferable elements from the Kentucky experience to our own. These principles pertain today as they did 5.5 years ago when our teaching proper began. We are, however, only now beginning to experience the rewards that come from this developmental approach to learning and teaching in community medicine.

In the first program year, the urgency of community need on the one hand and institutional need on the other forced the joining of the two in the operational design of the community medicine clerkship program. In other words, we enlisted our first clerks in the development of our community service and research programs. In marked contrast to the clinical rotations, with their well-established service and research base, our clerkships consisted initially of an effort to engage the student in learning at the sharp edge of unmet community need, using the disciplines of epidemiology and social science as the intellectual base for the expression of social concern. Every effort was made to match up student interest and future career plans with particular areas of faculty study and beginning model-building. Given the fact that the faculty had not yet reached agreement as to the specific educational objectives for the clerkship, however, the implementation of this matching principle carried with it certain unforeseen consequences. First of all, the very freedom of choice given the student tended to support the skeptical student's belief that community medicine was a "soft" discipline, long on ideals and short on substance. Second, the permissiveness of the system afforded the clinically minded student an almost irresistible opportunity to subvert community medicine learning to the pursuit of clinical interests through opting for a disease-oriented project that easily lent itself to a clinical emphasis. On the other hand, highly motivated students, with a commitment to learning what community medicine was all about, flourished in an educational climate that encouraged the exercise of their creativity and capacity for self-learning.

If learning for students was uneven in the first year of the clerkship program, the benefits for the faculty were enormous. These included:

1. The stimulation of concentrated work on the development of behavioral objectives for the clerkship as essential to the implementation of our belief in learner-centered education.
2. The enhancement of our understanding of the criteria for the selection of field learning opportunities, with particular attention to the ingredients necessary to convert a service or research program into an educational resource.
3. The clarification of our own understanding of the complementary relationship between community and clinical medicine.
4. The development of more precise knowledge of the attributes, limitations, and potentials of East Harlem as a learning environment.
5. Deepening respect for the relationship of the administrative organization and management of the program-to-program effectiveness.

6. A growing acceptance of the importance of process in both student and faculty development.

Progress toward the translation of these insights into actual program change, as reflected in the current program design, has been uneven. It has been influenced not only by the relative difficulty of the several developmental tasks involved in the translation but also by such everyday realities as time, competing interests and pressures, and the need to involve new faculty and to reconcile differences among faculty in preparation for taking next steps.

The current clerkship program is designed with the goal of helping the student learn to define a problem in community health terms. This means that he should look beyond the individual case and place the problem in the context of a population group.

The problem itself is subject to broad interpretation, encompassing such issues as health care delivery to a specific community or group, the working of a current health care delivery organization, human interaction in a medical setting, etc.

The learning goal of problem definition has been broken down into the following specific learning objectives which the student is expected to achieve by the end of the clerkship:

1. The student should select a potential area in health.
2. The student should make an initial statement of the importance of the problem, considering such areas as:
   a. prevalence and/or incidence of the problem
   b. geographic distribution
   c. extent of present knowledge
   d. feasibility of problem solution
      medical interventions
      socioeconomic factors
      political factors
      educational factors
      cultural factors
      available resources
   e. priority of the problem in relation to other problems.
3. The student should specify at least three questions which need answers for a proper statement of the problem.
4. The student should recommend methods for answering those three questions.
5. The student should demonstrate the ability to investigate one of the above questions:
   a. state a specific question to be investigated
   b. define a method for investigating the question
   c. analyze the information
   d. draw reasonable and logical conclusions.
6. The student should state methods for taking steps toward problem solution.
7. The student should present his findings in both an oral and written report.

These objectives can be fulfilled through one of the following routes:

1. Assignment to an ambulatory care setting, preferably away from the hospital, where there is an opportunity to combine clinical work with the development and testing of a hypothesis under the supervision of a community medicine preceptor.
2. Assignment to an ongoing community medicine field project (service and/or research) with a community medicine preceptor, usually the project director.
3. Independent epidemiological or social science research of a delimited nature under the direction of a community medicine preceptor.

Engagement in the clerkship is initiated through a personal interview between each student and the clerkship coordinator several weeks before the actual rotation begins. Designed to explore the student's educational goals, assess his learning style, needs, and preferences, the interview represents an important first step in the reconciliation of the student's learning needs and aspirations with the objectives of the program.

Although the personal interview has been used as the starting point of the clerkship since the program began, its effectiveness as an educational device has been greatly enhanced by: (a) our growing clarity as to the learning objectives of the clerkship; (b) the student's own basic knowledge of community medicine garnered from the enhancement and refinement of our required teaching program in the pre-clinical years; and (c) the availabiltiy of a growing range of community medicine service and research opportunities on which to base experiential learning. It is now the usual rather than the idiosyncratic experience to have the student come to the interview with a fairly clear notion regarding the particular problem he or she would like to explore and with general understanding of the factors involved in problem definition. With rare exceptions, by the end of the interview the student is therefore able to formulate a personal goal which falls within the general area of community medicine and to take the next step in the process, i.e., making an appointment with the potential tutor, identified by the curriculum coordinator, for further discussion of his or her actual learning experience.

The tutor is not necessarily an expert in the area chosen. Indeed, since, as indicated earlier, the goal is that the student should learn to define a problem it may be an advantage to have a tutor who approaches the specific problem *de novo* and uses his generic understanding of the principles of problem definition to demonstrate the process required. Parenthetically, this strategy is a powerful tool for faculty as well as student education. In addition to his community medicine tutor, the student generally also has a field preceptor, usually a clinician, who supervises his field work and gives him access to meetings, available data, etc. In principle, the field tutor could do the entire job. In view of the relatively recent development of community medicine, however, few practicing physicians have sufficient knowledge of epidemiology and/or health care organization, administration, and financing to enable them to carry full responsibility for student supervision. Because of the nature of health care practice in the urban environment, the field setting is usually a group practice, an outpatient department, a hospital emergency room, or, only rarely, a solo practitioner concentrating on family-type medicine. Field laboratories with which community medicine faculty members are associated on a consultant- or direct-service basis (such as the Yorkville Medical Group [HIP] [7,8] or the model comprehensive child care program developed under departmental leadership in an East Harlem public health station) have proved to be particularly valuable educational resources. As might be expected, students appear to learn most in those settings where: (a) they see, in action, the theoretical concepts, principles, and values on which community medicine is based; and (b) they are given generous, competent tutorial help and guidance in achieving their learning goals. Both program and faculty development are thus, in our view, critical to the full realization of the educational potential of community medicine teaching through the clerkship.

On some occasions, the field for study and/or the field preceptors are not affiliated with us. We recognize that other departments and programs have much to offer, and that experiences in an area chosen by the students may have more impact on their learning. We do require a written report of the work and an evaluation by a tutor in the field chosen. We also require preparation in advance, including a passing grade on a basic epidemiology examination, a tutorial in health care delivery, and preparation in the specific area chosen. During the last year students have fulfilled the clerkship requirements through doing projects in: sex knowledge and attitudes of medical students in Zagreb, Yugoslavia; incidence of surgery in the Group Health Cooperative of Puget Sound in Seattle; organization of rural medical care in Israel; and nutritional problems of Indians in eastern Peru.

As the foregoing description of the clerkship indicates, from the very start we have placed major emphasis on the learning-doing component as the principal educational motif of the program. Weekly seminar meetings are used to supplement field learning. Initially, the specific topics to be covered in the seminar sessions were selected by the clerks from a range of possibilities presented to them by the clerkship coordinator at a curriculum-building session on the starting day of the rotation. The administrative difficulties encountered in this à la carte selection, coupled with the fact that students have increasingly opted for the in-depth presentation and discussion of health delivery issues, have led to our assuming responsibility, as a faculty, for determining the content to be covered in the seminars. Our usual practice is to invite experts in a particular subject area to present the salient facts and issues, leaving ample time for student-faculty discussion.

These formal sessions, in addition to providing the opportunity to learn from experts, also stimulate and promote peer learning. The students bring knowledge and experience from their field placement to the sessions and challenge each other's ideas with vigor and forthrightness. Group learning is further enhanced by student presentations at the end of the 6-week rotation. Because these presentations have been so successful in promoting student and faculty learning, we recently inaugurated a review session during the second week of the clerkship in which the student presents the problem he or she has identified for study and his or her tentative study design for critical review by a faculty committee and his or her fellow students. This has proved to be a particularly good way of setting the process of group learning in motion from the very beginning and stimulating high standards of student performance.

The topics chosen for study by the students have been summarized previously (5). Generally, most students have worked in primary care settings, and done simple investigation of an area such as patient satisfaction or interprofessional functioning. Certain changes can be perceived with time, however: (1) more epidemiological projects; (2) more data collection; (3) more interest in prepaid group practice; (4) more health care studies of such areas as cost; and (5) more focus on medical sociology.

In keeping with medical school policy, we are required to grade each student on the basis of Pass, Fail, or Honors. Finding a way of meeting this requirement within the context of our own standards of accountability and our own belief in evaluation as a positive rather than coercive instrument of learning continues to be a challenge. Currently, each student is graded on the basis of: (a) a rating scale which his or her tutor completes; and (b) an oral and a written report evaluated by a faculty jury of three. While the evaluative task has become simpler as the objectives of the clerkship have become clearer, we still encounter discrepancies between a tutor's assessment of a student and that of the faculty jury. As jurors, we are aware of the fine judgment it requires to make the distinction between facility in oral and written presentation and actual working grasp of the principles of problem defintion in community medicine terms.

While skeptical about our skills as evaluators, we tend to place a great deal of value on the students' capacity to evaluate us. A written feedback instrument has indeed given us important information as to general attitudes toward a clerkship in community medicine, as well as clues regarding the factors in the clerkship experience that promote or impede learning.

As might be expected, students react to our program in a variety of ways. About one-third of our students enter the clerkship with a firm specialized interest in a specific medical field, such as allergy, nephrology, cardiology, etc. Starting from where the student is, it is often possible to show him or her psychosocial aspects of disease he or she was not aware of previously, and he or she inevitably learns some epidemiology. Another third of the students are oriented toward community medicine or family practice, and are very demanding and sometimes critical of the department. The remaining third of the students are open-minded, uncertain, and sometimes confused. This is the group which seems to learn the most from such a clerkship.

This latter fact has been of tremendous importance in resolving any doubts that in moments of frustration we might have entertained as to whether a clerkship in community medicine should be required or optional. With this renewed conviction as to the educational validity of the requirement, however, there is also growing realization of the factors—human and material—upon which the clerkship depends for its maximum effectiveness:

1. *Exposure to the principles of community medicine as part of the required learning of the preclinical years.* In our case, the decision reached 2 years ago to consolidate community medicine teaching into a first course in biostatistics and epidemiology (9), and a second-year course—the study of a family—is strongly affecting students' readiness for and expectations from the clerkship.

2. *Support for faculty.* Like faculty everywhere, we are continually confronted with the irony of a medical educational system which offers the least reward for the performance of what is ostensibly its principal function—i.e., the facilitation of learning through creative teaching. Our teaching efforts have, by and large, been kept alive by the personal commitment of voluntary faculty or by piggybacking on the research and service activities of full-time staff members. Under such circumstances, it is difficult to insist on the rigorous standards of excellence in educational performance with which the success of the program is intimately allied.

3. *The development and maintenance of a trusting relationship with community health care consumers and providers.* Essentially, our field learning opportunities are the outgrowth of departmental investment in a partnership with the surrounding community, designed to strengthen the community's capacity for understanding and meeting its health needs. Students have been and continue to be particularly skillful in engaging the consumer's con-

fidence and beginning trust in the integrity of our purposes.

4. *The development and maintenance of viable linkages with clinical medicine both within and outside the institution.* Having awarded top priority in our first years to the outside community needs and resources, we are at an early stage in the development of mutual trust, understanding, and *modus operandi* with our clinical colleagues within Mount Sinai, its affiliated hospitals, and in private practice. We are now identifying important areas of common concern and interdependence in research and service—some of them first uncovered through the exploration of ways of meeting the students' need for an experience that linked community medicine with specific clinical interests.

5. *The promotion of interprofessional and interdisciplinary teaching and learning.* Since our faculty is organized and staffed along interprofessional and interdisciplinary lines, interprofessional and interdisciplinary teaching is a given fact in our entire educational program. Conjoint learning for students from the various health professions has been more difficult to achieve as a consistent element in the clerkship. We continue to work on the pragmatic issues of scheduling, faculty back-up, etc., which interfere with our ability to make good on our own commitment to this essential feature in education in community medicine.

In summary, we have reached the 5-year point in the offering of a required clerkship in community medicine with a deepened understanding of the ideational and pragmatic nature of our responsibilities and continued conviction as to the importance of the clerkship model. The ultimate outcome of our efforts, the performance of our graduates as agents of community health, awaits long-term follow-up study. Our observation of student behavior at the end of the clerkship, however, supports our belief that community-based learning to define a problem in the multidimensional terms of community medicine enhances the student's perception of the complex nature of health problems, sensitizes him or her to the operation of the health care system as it promotes and impedes optimum community health, and provides him or her with a broadened understanding of the physician's role as an agent of positive health.

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13

TEACHING RESOURCES FOR PREVENTIVE AND COMMUNITY MEDICINE: ACTIVITIES

Robert E. Carroll

Actual participation by the student in diagnosis and treatment has always been a dominant part of the teaching of clinical medicine in the United States. Demands for more academic rigor have resulted in shifts from almost pure apprenticeships to formal didactic teaching in the basic sciences, but the clinical clerkship has remained. Of all the major clinical specialties, preventive and community medicine has had the most difficult time in devising satisfactory activities for student participation and has utilized them least.

A fundamental basis for this distinction lies in the fact that, by definition, community medicine deals with health problems of groups of people as opposed to individual patients. Such groups are not as numerous as the individuals, are less accessible to student contact, and may have complex health problems requiring more skill and knowledge than the average student can be expected to possess. For example, a student assigned to a patient with a myocardial infarct may in a few hours greatly expand diagnostic and therapeutic skills while feeling that he is a part of the clinical team. Investment of the same time span in an epidemiologic research project or heart disease control program is unlikely to yield the same relative results and satisfaction at being a useful participant.

Despite the difficulties, a variety of activities have been tried in various medical schools in efforts to enhance the learning of community medicine. Careful and critical delineation of curriculum goals and objectives is crucial before making the decision to use an activity for teaching. At times the desire to please students or "get away from the lecture" initiates activities that enable the community medicine "rotation" to have a format similar to that of other clinical subjects. Careful consideration of the strengths and problems involved in student placement, however, can lead to a strong, dynamic teaching program.

The types of activities commonly undertaken may be divided into those that involve the student with an individual case or patient, and those where involvement is directly with the group or community oriented process, program, or agency.

The individual case approach most closely approximates what the majority of students will encounter in future practice. This type of community medicine teaching can be integrated with other clinical rotations to increase student perceptions of relevance. One successful technique is family health studies of patients that are being seen on other rotations. Along with his regular workup of a case for presentation, the student is required to examine aspects pertinent to preventive and community medicine. Questions may be asked, such as: the cost of this illness to the family and society; how could the health system have prevented the illness; what resources will be needed for future care? The cooperation of another clinical department is essential so that the student feels the information he has obtained and is reporting is of practical use beyond just impressing the professor of community medicine. If the teaching goal is simply to awaken the student to aspects of disease and health beyond the individual doctor-patient relationship, then cooperation with every clinical department is not necessary.

Although still working at the individual case level, a student may be assigned to a health care program or agency that encompasses community aspects in its activities. An example would be working as a clinical clerk in a community health center that has an interdisciplinary approach. In this case, the student is still practicing in the familiar doctor-to-patient role, but the ongoing system around him forces an awareness of community factors, in contrast to the more theoretical approach of the previously described case discussion method.

Many factors hamper the successful placement of students into an active role in such community oriented agencies. Community or consumer boards usually have a major input into policy and traditionally have been unwilling to subject their clients to a "guinea pig" role for teaching purposes. As opposed to teaching clinics in a medical center, these agencies were designed to provide efficient service and often are reluctant to absorb the disruption in model function that the presence of students seems to imply.

In programs where allied health personnel and physician extenders are well utilized, the role of the physician often requires skills that a medical student does not yet have. For example, a nurse practitioner or physician associate may perform histories and physical exams and consult the physician only for complex problems or back-up. The role of the medical student preceptees is then confused. He or she cannot practice the elementary skills learned and report to the physician associate, nor can he or she answer the more difficult problems that the associate brings to the physician. Under these circumstances, utilization of the medical student in a patient-advocate, rather than physician, role can be successful.

Some schools have developed opportunities for placement of students in developing countries or medically underserved areas within the United States. In these situations the need for medical help often is sufficient that the student's knowledge and skills can be well utilized. The broader health problems in these areas are also obvious enough that the student cannot help but expand his view of the role of medicine and the need for a community approach. Whether placements are organizationally labeled as part of preventive and community medicine seems not as relevant as that they exist.

In contrast to the individual patient or family approach described above, the other major class of activities and field placements involves the student directly in problems of a community either in program implementation or research.

Perhaps the simplest of such activities to plan and execute is the simple field visit by a group of students. For example, in days when sanitation was stressed, group trips to the local sewage treatment plant were common. A modern occupational health facility in a large industry might be a current example. The field sites of many community medicine activities today may not have the visual and sensory attractions of the classic sewage plant. Careful thought should be given whether the trip warrants moving numbers of students instead of bringing the program director to the classroom for a seminar.

Commonly used in epidemiology courses are problems or exercises that force the student to analyze and make decisions at a community level. The situation is artificially recreated for the student, either on paper or by discussion. While this lacks some of the drama and excitement of real life, the exercises can involve current pertinent questions, such as interpretation of the leader's own research data. Student involvement can become quite intense if they feel challenged to make decisions or offer advice, rather than just performing "busy work" calculation of rates. A number of medical school departments have these exercises and they can be used as is, or adapted to meet teaching needs. Frequently, the precise subject matter is not as important as the method, and a problem in which the leader is involved or knowledgeable provides a more dynamic session. For example, the review and analysis of a rather simple, local outbreak of food poisoning may be much more effective for the student than presentation of the instructor's favorite classic, such as Snow's cholera.

Instead of the classroom exercise, students may be assigned, individually or in small groups, to a community agency or program. Often they are asked to serve in a sort of participant-observer role, and to produce an analysis of the agency in a written report or presentation for their classmates. This type of activity can be very successful for certain students, but is difficult to arrange and coordinate for large classes over a long period of time. Often the students' opportunity for actual participation in what they consider a meaningful medical role is limited, and the observer relationship predominates. Careful planning and discussion with agency personnel who will work with the students are essential so that they understand the educational objectives and goals.

Decisions about appropriate educational activities in community medicine will always depend very much upon the local situation, both within the medical school and the community in which it operates. Activities should never be undertaken or developed just to "do something" or in an attempt to salvage an unpopular course. When educational goals and objectives are carefully developed, and the teaching program designed to best accomplish them with the resources available, community medicine activities can be as exciting and challenging as other clinical rotations.

14

TEACHING RESOURCES IN PREVENTIVE MEDICINE: READINGS

Frederic Bass

To address the omnipresent but elusive subject of readings and their use, this paper directs itself to three questions:

1. What is the role of readings in teaching preventive medicine to medical students?
2. What criteria should be used to assess the value of a reading?
3. How can the Association of Teachers of Preventive Medicine and the Fogarty International Center contribute to a more successful utilization of readings in preventive medicine?

READINGS AND READING IN TEACHING PREVENTIVE MEDICINE

To begin a definition is needed. By readings I refer to published, printed, or mimeographed materials unaccompanied by electronic audiovisual materials. Readings include books, journal articles, monographs, government documents, transactions of conferences, reports of health agencies, case studies, and reviews of the literature.

Readings have several potential teaching purposes:

- to present significant concepts, methods, observations and conclusions
- to define problems
- to articulate policy
- to review the literature on a given topic
- to illustrate key attributes of research design
- to describe the history of a particular problem
- to demonstrate a style of thinking worthy of emulation or avoidance
- to provide references to pertinent works.

In considering the uses of readings, we must keep in mind those who will be doing the reading and their purpose in pursuing the subject. Is the reader a first-year medical student taking a required course, a fourth-year student in a preventive medicine elective exploring one topic in depth, or a general practitioner attempting to apply preventive medicine to his or her practice?

We must also consider how a given reading will contribute to the knowledge, attitudes, and skills that preventive medicine seeks to impart to its students. Generally speaking, objectives that are fulfilled by reading tend to lie in the cognitive realm, less frequently in the realm of skills, and, more rarely, in the realm of attitudes. Yet it is in the realm of attitudes that we in preventive medicine face our greatest tasks—to encourage students to see their patients as members of groups, to find reward in preventing illness, and to help correct the inequities that exist in access to good health care. Writings which can inculcate the attitudes we seek to establish should be identified and promoted.

To isolate the independent effect of a single reading, a set of readings, or even a course in preventive medicine upon a medical student's future professional performance may be an impossible problem in multivariate analysis. However, there is one prime ingredient which I trust has an identifiable, long-term effect—the feeling of pleasure and mastery associated with successful problem-solving in matters of life and death. In her paper on teaching prepared for this workshop, Dr. Elizabeth Barrett-Connor noted:

> *Perhaps the most positive thing I can say about teaching epidemiology in this way is that it is fun. While it may be thought by some that 'fun' is irrelevant, I believe that a fundamental appeal of epidemiology is its appeal to the puzzle-solving proclivities of man (*this volume*).*

This is not the place to weigh the pros and cons of readings as compared to other methods—lectures, small group discussions, audiovisual presentations, field trips, or patient work-ups.

However, reading skills do merit comment. Reading, as one of the highest order functions in which man regularly engages, invites a continuous formulation of hypotheses to explain the flow of symbols that rush past the eye (*1*). Reading subsumes a variety of maneuvers, i.e., skimming, scanning, studying, reading, and rapid reading (*2*). The most vital phase of learning occurs when the reader is not looking at the book but reflecting on what he has just perceived (*3*). Yet, despite continuing developments in the applied science of reading, medical educators tend to take an uninformed approach to the subject. In his broad examination of teaching in medical schools, Miller reported that almost nothing was known about the reading ability of medical students nor about the precise readability of the printed materials used to instruct them (*4*).

In recent years, several reports have attempted to relate success in medical school to scores on the Medical College Admission Test (MCAT), which to some extent reflect reading ability. The results have been mixed, showing no linear relationship of MCAT scores with success but indicating that those with below-median scores are more likely to drop out of school (*5,6,7*). Would changes in the level of complexity of readings, their style and format make for more effective learning? Would systematic training in reading help medical students? We have little information on this. Recently it has been observed that the best readers are also the best medical students (*8*). If in fact any kind of causal relationship exists between reading competence in medical school and future performance as a physician, then the process of reading must receive much more attention from medical schools than it has received thus far. Several authors recently have addressed the relationship of readings to the rest of the medical curriculum (*9,10*). They have underscored the range of the kinds of readings available and have noted that advantage can be taken of variation in student reading taste to encourage each student to select what he finds most interesting, rather than to enforce one standard on the entire class.

To summarize the points made in this section:

1. In examining and selecting readings, as in other aspects of our teaching, we should proceed from defined instructional objectives.

2. One important measure to seek in readings and in student response to them is enjoyment of the material.

3. We need to determine the most effective deployment of readings for transmitting cognitive knowledge and for inculcating attitudes and sharpening skills.

4. We need to work to improve medical students' reading skills and to study the relationship of student reading skill and performance in medicine.

CRITERIA FOR ASSESSING READINGS

Miller has suggested a set of criteria based upon empirical evidence that is useful in choosing books or journals (*11*):

1. Does the material contribute to the achievement of the objectives of the course of study?
2. Is the work presented of good quality?
3. Is the material interesting and written in simple, clear language?
4. Are the organization and format attractive?

Wynn describes the "three S's" of a good medical text book: selective, sequenced, and simplified (*12*). As implied in Morton's approach to teaching methods, readings should be selected in relation to the total constellation of the teaching situation: the learning objectives, the learner's interests, the setting, the teaching task, and the means of evaluation to be used (this volume).

As previously noted, we can exploit the interaction of readings with students' other activities and responsibilities. For example, a reading about the geographic origins of hospital patients can be integrated with the students' clinical experience on a medical clerkship. Journal articles on medical topics currently the object of debate make for stimulating and successful student participation (this volume). At McMaster the introduction of each major topic is accompanied by review articles on the subject, and these placed on overnight reserve for the students (*9*).

In many respects we can view the evaluation of readings as analogous to the evaluation of medical care itself. There are *inputs* (the quality of a reading for its information, clarity, and appeal); *process* (how readings are presented in relation to lectures, discussions, patient experiences, and the patterns in which readings are assigned in relation to one another); and *outcomes* (how well students recall facts, reveal attitudes, and provide better preventive care for their patients). How many of the readings we assign actually have been tested with respect to these aspects—input, process, and outcome? If we did so, and if we defined our instructional objectives more systematically, the success of our teaching in preventive medicine would improve.

To summarize, criteria for selecting readings in preventive medicine should concern:

1. Input aspects
    a. Does the reading address a teaching objective?
    b. Is the reading clear, well-organized, and appealing?

  - c. Have the readings been chosen selectively?
- 2. Process aspects
  - a. Do the readings fit well with the other instructional methods being used?
  - b. Are the readings available and are they read?
- 3. Outcome aspects
  - a. Do the students better fulfill the short-term instructional objectives because of the readings?
  - b. Are students satisfied with the readings?

THE NEXT STEPS

By joining forces, the Association of Teachers of Preventive Medicine (ATPM) and the Fogarty International Center (FIC) have the opportunity to become a major influence upon the teaching of preventive medicine. With its proximity to the National Library of Medicine and its mandate to contribute to prevention, the FIC is particularly suited to complement the expertise offered by ATPM in the development of readings.

Before proceeding to specific recommendations, let me first report on a quick and informal survey of reading lists in use in preventive medicine, a survey done for this conference. To estimate the feasibility and value of sharing lists of references, 23 of the participants expected at this conference were requested to forward their course reading lists and their departmental teaching bibliographies. Fourteen persons responded, sending 11 sets of references. Among the 80 pages of references were more than 200 books and more than 500 articles. A compendium of these reading lists was made available to conference participants and, on initial review, was well received.

The logistical problem of preparing and maintaining a selective, edited list of references becomes quickly apparent: duplication of articles, need for standard format, and difficulties in deciding which references are essential and which are not. Despite these problems, it seems to me that the periodic issuance of basic reading lists could be a useful contribution by ATPM and FIC.

By far, the best, currently available bookshelf of readings in public health, medical care, and allied fields has been assembled by La Rocco and Jones of the Harvard Center for Community Health and Medical Care. It contains 610 annotations, most of them published in the period 1960–71 (*13*).

RECOMMENDATIONS

1. On objectives:

a. ATPM should clarify and specify the minimum educational objectives for each student in preventive medicine in respect to cognitive knowledge, basic skills, and desired attitudes.

b. ATPM should develop a formal classification of the component subject areas of preventive medicine in order to catalogue the diverse kinds of readings found in our field.

c. Educational objectives and the classification of the component areas should be up-dated periodically.

2. On the initiation of evaluation:

a. ATPM and FIC can render a valuable service by compiling, sorting, and evaluating readings and other teaching materials in preventive medicine.

b. Conferences on teaching methods, teaching resources, and their evaluation should be conducted periodically for those in preventive medicine who regularly teach medical students. Readings should be considered in conjunction with the use of other teaching resources.

c. ATPM, in formulating a system of evaluation of readings in preventive medicine, should draw upon the knowledge of those who have studied the reading practices of medical students and physicians.

3. On the assumption of logistical responsibilities:

a. Bibliographies of published teaching materials used by departments of preventive medicine should be gathered via a standard format (e.g., a structured 3 × 5 card) that would include a notation as to the item's subject area (as per 1b above) and the teaching objectives which the item is found to fullfill.

b. After culling the references submitted, two files should be maintained for each subject area of preventive medicine—one file to house reference cards; the other to hold the references themselves. The most suitable site for such a file would be within either the National Library of Medicine or the Fogarty International Center itself.

c. For each major subject area of preventive medicine, an abbreviated (basic) and an extended (advanced) teaching bibliography should be published and updated periodically.

4. On reading performance:

a. ATPM and FIC should encourage the Association of American Medical Colleges and the National Library of Medicine to engage in an extensive examination of the reading skills and practices of medical students, house officers, and practitioners. In view of the vital nature of reading skills, it would seem worthwhile to undertake a controlled trial of the value of teaching advanced reading skills to medical students.

b. In relation to the teaching of preventive medicine and its literature, the reading and learning patterns of medical students and house officers should be surveyed periodically.

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15

PEOPLE AS A RESOURCE FOR THE TEACHING OF PREVENTIVE AND COMMUNITY MEDICINE

Herbert Lukashok

THE REQUIREMENT OF A MULTIDISCIPLINE DEPARTMENT

However the subject matter of preventive and community medicine might be defined, probably all will agree that our concern is with the health problems of society and the means available for solving them. All our program efforts are involved in teaching—with varying degrees of emphasis—the social, economic, and political factors which affect health and disease in the individual patient and the community. Within this broad framework there exists a variety of curricula depending upon the interests and experience of faculty and the educational priorities of our respective medical schools: epidemiology, biostatistics, public health, the health care system, disease control, the relationship of poverty to illness, social policy issues in health, environmental pollution, forms of medical practice, and so on. Each list would be different, but certain subjects undoubtedly would recur with great frequency.

Furthermore, at Einstein, that core group of students whom we see on a more than casual basis seem increasingly to be interested in careers in primary care or family practice in some rural or urban setting. To us and to them this implies training and experience in the team practice of medicine, and learning to work with other health professionals and with consumer and community groups.

Demonstrably, then, with such a broad and multifaceted curriculum, our departmental faculties will necessarily be multidisciplined and interprofessional. They will contain a wide spectrum of skills and experience, traditional and innovative, with or without the usual academic credentials.

This has been borne out by a recent survey reported by Marshall et al. (*1*). In this study, 82 medical school departments of community medicine responded to a questionnaire addressed to the matter of promotions of nonphysician faculty. Respondents from 68 departments identified 35 disciplines other than medicine represented on their faculties and almost one-third reported 10 or more disciplines.

The following table, taken from the above study,

TABLE 1. Disciplines Other than Medicine Represented in 68 Departments of Community Medicine

Discipline	Departments Reporting Discipline	
	No.	Percentage
Behavioral science[a,c]	50	74
Administration and management[d]	40	59
Nursing[d]	37	54
Biostatistics[c]	37	54
Social work[d]	33	49
Environmental health[d]	30	44
Basic medical sciences[b,c]	29	43
Economics[c]	25	37
Health planning[d]	23	34
Health education[d]	21	31
Epidemiology[d]	15	22
Nutrition[d]	14	20
Engineering[e]	13	19
Law[e]	8	12
Dentistry[c]	6	9
Computer technology[d]	4	6
Physical therapy[e]	3	4
Occupational therapy[e]	2	3
Architecture[e]	2	3
Consumer advocacy[e]	2	3
Demography[c]	2	3
Genetics[c]	2	3
Pharmacy[e]	2	3
Speech therapy[e]	2	3
Veterinary medicine[c]	2	3
Audiovisual technology[e]	1	1.5
Divinity[e]	1	1.5
Entomology[c]	1	1.5
Journalism[d]	1	1.5
Optometry[e]	1	1.5
Physical education[d]	1	1.5
Physician associate[e]	1	1.5
Physics[c]	1	1.5
Radiologic technology[e]	1	1.5
Vocational rehabilitation[e]	1	1.5

[a] Sociology, anthropology, political science, and psychology.

[b] Anatomy, biochemistry, microbiology, physiology, pathology, and pharmacology.

[c] Doctorate degree level.

[d] Master's degree level.

[e] Bachelor's degree level or other (degrees in divinity, architecture, engineering, and law are often considered equivalent to the doctorate degree).

indicates the broad range of disciplines represented in departments of community medicine (Table 1).

The paramount goal is the mounting of a successful teaching program by drawing upon the diverse personnel resources available within the department, the medical school, the university, and the community.

STAFFING PATTERNS

There are no hard and fast rules governing the locus of faculty appointments. Diverse patterns exist. Traditionally, certain faculty, i.e., epidemiologist, biostatistician, public health physician, have their appointments within the department of preventive and community medicine. Others on the above list might or might not have their appointment in this department. Frequently, in the case of social and behavioral scientists, the main appointment is in the basic discipline in the university with a joint appointment at the school of medicine. Joint appointments are also common between the department of preventive and community medicine and other departments of the medical school itself.

While it is obviously desirable for our departments to have a strong core of full-time, multidisciplined faculty—realistically, key faculty frequently will be located outside of the medical school itself. The real issue is to obtain the professional skills necessary for the teaching program, regardless of the locus of individual faculty members.

APPOINTMENTS AND PROMOTIONS

Appointments and promotions in departments of preventive and community medicine represent a particularly complex and knotty problem within the constraints that exist in the typical school of medicine.

Many of the activities of our departments and their faculties differ from traditional modes of academic functioning. While a typical department's activities subsume those areas generally acknowledged as within the academic scope (teaching, research, clinical treatment, scholarly activity, etc.), there are in addition major areas of functioning of many departmental faculty which are difficult to assess by the standards and criteria generally applied to the more conventional academic activities. Included in these would be community service programs, administrative activities, program development and innovation, and organizational activities.

In addition to deviation of these functions from the traditional activities of academic medicine, there is the fact that the population to which these activities are addressed also differs from that associated with usual and accepted academic work. While students, colleagues, and other scientists do form a significant portion of the spectrum of those in the position to assess and relate to our activities, we also find ourselves dealing with individuals (both professional and nonprofessional) outside the campus and even outside the academic and scientific communities. Many service projects require working with political, legal, and administrative personnel only tangentially related to academic medicine. Yet our success and failure in dealing with these individuals comprise an important benchmark of our accomplishment as professionals.

This is a tough problem to resolve. A department should develop its own criteria of excellence within the framework of activities peculiar to it; for example, contribution to health services and administrative work—in addition to the more traditional areas of effectiveness in teaching and research accomplishments. As an example of what might be done in the health sciences area, policies developed in the University of North Carolina at Chapel Hill are included as an appendix to this paper.

Once the departments develop their own standards for these newer categories of activities, they will be in a much stronger position vis-à-vis the appointments and promotions committee of the school. Realistically, a continuous and difficult process of education and enlightenment will be necessary.

APPOINTMENTS FROM THE COMMUNITY

A related issue is the use in departmental teaching programs of newer types of health personnel such as family health workers, community organizers, and nonprofessional consumers of health care. At Einstein, in most instances, this group has supervised or worked with our students in assigned community placements, though on occasion they have also participated in panel discussions and seminars. Faculty appointments for them are particularly difficult to arrange since often they do not have traditional academic or professional credentials.

We have found that community people bring to students a direct practical and personal point of view and experience. However, it is obvious that departments must strive for an appropriate balance between, on the one hand, the intellectual and conceptual support that students require as provided by the more conventional academic faculty and, on the other hand, the experiential perspective uniquely furnished by the newer and less traditional health worker.

CLINICAL FACULTY

A word is necessary about the need for departments of preventive and community medicine to utilize, on an interdepartmental and interdisciplinary basis, faculty from the clinical departments. We have found that a most effective way of transmitting the principles and concepts of preventive and community medicine lies within the framework of a clinical or patient care situation. This is just as true in working with first-year students who have no clinical training as it is with senior students who are already functioning as subinterns. In the former case, faculty from the department of community medicine collaborate in supervision of students in, for example, following a pregnancy with the obstetrician, pediatrician, and psychiatrist. In the latter instance, we participate with faculty from the departments of medicine and pediatrics in a primary care clerkship required of all senior students.

STUDENTS

Finally, a word about students—an essential but ever-changing resource. A few years ago we seemed to be in constant confrontation with the radicals who represented a strong minority among the students at Einstein. Today most students are apt to be placidly neutral in response to our teaching program. We are delighted, however, that each year there is a core of students who are interested and committed and for whom we are happy to initiate elective seminars and tutorials. These students are the ones who participate with us in the development of departmental teaching materials and curriculum.

Moreover, we have seen groups of students organize on their own, with encouragement and some financial support from the department, special seminars with regular attendance of 15 or 20 students and faculty. In brief, a strong case can be made for the concentration of faculty time and effort on that small but ever present group of students who manifest an early interest and commitment to community medicine. It is unrealistic to expect broad and active response from the student body, given the competing educational priorities and goals that now obtain in most medical schools. Programs such as ours can have significant general impact only in the context of radical curriculum change in the medical school as a whole.

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APPENDIX A

In the course of workshop discussion of faculty appointment to a department of preventive medicine, reference was made to the recent effort of one university to spell out many criteria and considerations that appear to apply today. The committee report, which was adopted as institutional policy for all appointments in the health sciences field, follows.

The University of North Carolina at Chapel Hill[1]

Criteria of Excellence for Faculty Appointments and Promotions: Teaching and Professional Service

Outline

Introduction
Overall criteria for consideration
Factors related to teaching excellence
Evaluation of above
Factors related to professional service excellence
Evaluation of above

Introduction

Vice-Chancellor Sheps assigned this Committee the responsibility for preparing criteria of teaching and professional service excellence for consideration in faculty appointments and promotions. Criteria for research and scholarly excellence customarily have been explicitly adduced and there is long experience with their consideration. This is not the case for the other criteria which have been less systematically applied, and have often been implicitly considered, if at all. Their explicit development does not detract from the importance of faculty research and scholarship. Rather, it is intended that they focus attention on the broad range of faculty activities and responsibilities to be considered, where relevant, along with research and other scholarly activities.

In the outline which follows, suggested criteria are presented, and relevant sources of information concerning these criteria are noted. The criteria are not presented as final or definitive. They should be subjected to a continuing process of review and evaluation and altered as experience and future contingencies dictate.

Overall Criteria for Consideration

Transcending specific excellences in teaching or professional practice are certain personal attributes which merit consideration. These may include:

Intellectual integrity
Pervading and continuous curiousity
Imagination
Logical rigor
Conceptual clarity
Systematic approach
Communication skill, verbal and written
Grasp of alternatives
Solid grounding in field, kept current
Receptivity to new ideas or change
Critical capabilities
Analytic capabilities
Effective use of literature and other resources
Reliability and responsibility
Scholarship and creativity
Ethical and colleague sensitivity

Along with this solid base of personal attributes, specific criteria concerning teaching and professional service excellence should be investigated.

Factors Related to Teaching Excellence

These may be grouped into four components: (1) degree of responsibility; (2) innovation; (3) effectiveness; and (4) impact upon students.

1. *Degree of Responsibility*
   Scope of teaching with regard to general assignments
   Essentiality of teaching duties with regard to mission of department, service, or school
   Any exceptional responsibilities undertaken, assigned or voluntary
   Size and level of teaching load.

2. *Innovation*
   Improving teaching methods

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[1] Submitted by B. G. Greenberg, Dean, School of Public Health for the Health Sciences Advisory Committee on Appointments and Promotions

Enlarging or improving course content
Development of new courses or programs
Devising new teaching techniques or materials
Provision of new learning experiences
Educational research
Curriculum development or revision
Contribution to educational theory
Spirit of inquiry suffuses teaching

3. *Effectiveness*
   Mastery of subject matter, kept current
   Mastery of interpretation
   Effective oral and written communication
   Ability to synthesize range of material
   Clear setting of goals and good progression toward them
   Links own work well to that of others and to the field in general
   Exceptional skills, re: approach or content

4. *Impact upon Students*
   Students interested and responsive
   Number and quality of students
   Students catalyzed to independent investigation
   Professional careers of former students
   Constructive responses to students' ideas and experiences
   Role as student advisor
   Impacts upon student career choices
   Counseling with students
   Mutual respect of teacher and students

Evaluation of Teaching Criteria

Most information relevant to this Committee assignment notes the sources, rather than the details of evaluation. There is fairly general agreement concerning sources which, indeed, comes close to being common sense. There is rather less agreement on how the information secured from the sources should be handled. For some, the information is the basis of thoughtful and careful value judgment. For others, reliance is placed upon rating techniques. Our focus here will be to note the sources of data rather than to suggest how such data should be processed. It is left to others to decide whether to approach evaluation as a science or as an art. Some suggested sources:

Peers (colleagues)
Students
Administrative superiors (chairman, dean, course director)
Supporting materials: syllabi, laboratory manuals, reports, creative publications
Self-evaluation: stating goals and reviewing performance
Development of score sheets for course evaluation

Factors Related to Professional Service Excellence

New programs in health sciences have brought new kinds of occupations and professions into the teaching setting. Often they do not satisfy the customary criteria for academic appointments and promotions. The case is the same in health care activities, which more and more spill over the customary clinical settings into unaccustomed community settings. To meet the entailed problems new criteria of achievement and competence must be sought.

In reviewing professional service excellence certain general considerations prevail; there are others specific to the settings of practice. Further, two types of professional service excellence may be considered: one involves the practice of intrinsic professional skills, the other concerns a broader variety of services which professionals may be called upon to perform. These will be listed here as primary and related professional services.

Primary Professional Service Criteria

Form and setting of service (patient care, program, clinic or community; treatment, consultation)
Time spent in practice and load carried
Relationship of professional activities to teaching and research
Relationships to goals of department, service, program, or school
Degree of essentially, re: teaching program, patient service; special program; special knowledge or skills
Ratio of assigned to voluntary activity
Special competencies or skills, re: disease process, diagnosis, therapeutic procedures, modalities of care, programming of service, clinical teaching or research
Degree of innovation in activities: treatment,

clinical teaching or research, community programming

Growth in professional competence and recognition (added clinical responsibilities, more demanding assignments, publications, associational memberships, professional memberships, membership on review boards, site visits, consultations, prizes or awards, special leaves, special training).

Criteria Specific to Setting of Practice

The changing modes of health care practice entail certain difficulties for the promotional review process. Established criteria frequently prove inadequate or irrelevant in evaluating new types of professionals or new forms of professional activity. There must be constant alertness to the need for varying criteria and broadening their scope. They are, of course, already broad and varied.

In settings of direct patient care, for example, abilities such as differential diagnosis and patient management may be of central concern. Personal relation abilities may be of focal interest. In the development of care programs, other kinds of consideration emerge: the contribution to initiation, modification, or operation. Here organizational ideas may prevail. Where programs are established outside the academic setting still other forms of consideration prevail: leadership and organizing capabilities, ability to work with and coordinate diverse lay and professional groups of people with varying (often conflicting) interests. Here the understanding of community processes may be of central importance.

The field of health care has grown so complex that this range of considerations no longer distinguishes among the professional schools but is shared by all.

Related Professional Service Criteria

The increasing complexity of the university has multiplied the opportunities and demands for services of many kinds by members of the faculty. Such services often consume a considerable portion of an individual's professional activities. Indeed, for many, in terms of responsibility and time required, they may become the primary activity. Where such services are important and necessary they should explicitly be considered as a performance criterion.

Related professional service activities may take place in a variety of settings and at various levels. For example:

Service to the profession: participation in professional society activities, including holding office, administrative tasks, or special committee work; editorial work or journal management; organizing programs and meetings; special assignment to professionally sponsored studies or task forces; assignments to special investigative committees; membership on licensure, certification, or specialty boards; participation in continuing education; service on national or international professional committees or commissions.

Community services; consultation and guidance to community health projects (drug abuse prevention, public education, etc.); participation in health care planning programs; service with organized programs such as Regional Medical Program, Office of Community Health Services, Comprehensive Health Planning, etc.; work on special programs to meet community needs; preparation of material assaying community needs and resources; outreach clinic activities; service on community boards; service or consultation on national or international health projects; work with governmental agencies; participation in extracurricular activities of school or university.

Administrative services: appointments to office (at the level of department, school, division, or university, often may be the primary activity); committee or board assignments (also at the several levels); special assignments (search committees; course, program, or facility planning groups).

Evaluation of Professional Service Criteria

Here, again, the sources of information are legion. The ways in which the information is arrayed and weighted are matters for continuing exploration. Among suggested sources are:

Publications (including preparation of teaching material)

Colleagues (including those who share the work setting)

Students

Patients
Administrative heads (chairmen, deans, program directors, administrators)
Community agency staff
Sampling of patient records
House Staff
Medical records committee
Nurses
Social workers
Outside referees
Program plans, summaries, progress reports
Candidate's self-review
Evidence of increased professional skill, responsibility, and recognition (see above, Primary Professional Service Criteria)

Considerations of professional service excellence should include the need and demand for such service, whether the activity is assigned or voluntary; its importance in meeting school of departmental goals; qualities of innovation or leadership in performing such activities; the degree of responsibility involved; time required and duration of the activity; the quality of performance (effort required and contribution made); the range and number of such activities; and the contribution to professional growth.

Prepared by the Health Sciences Advisory Committee on Appointments and Promotions:

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September 1972

PART III

GRADUATE EDUCATION: RESIDENCY TRAINING IN DEPARTMENTS OF PREVENTIVE MEDICINE

Chairman: ***Dr. Joseph Stokes, III***

16

CHAIRMAN'S REPORT OF CONFERENCE ON RESIDENCY TRAINING IN PREVENTIVE MEDICINE [1]

Joseph Stokes, III

BACKGROUND OF THE CONFERENCE

The last decade has been a period of unusual ferment in the field of community, preventive, and social medicine. The reasons for this are complex but stem principally from a wave of social concern not unlike the public health movement of the 1920s. This concern is based not only on increasing public and professional awareness of the health care needs of underserved groups, and the inequitable distribution of health services, but also on the rising costs and inefficiencies of the health care system. Shifting priorities are also involved, such as the disproportionate allocation of resources between the "disease care system" (i.e., that system which responds to the needs of patients after symptomatic disease develops) and the "health care system" (i.e., one that includes a focus on the maintenance of health and the prevention of disease).

This ferment has strongly influenced both departments of preventive and community medicine in medical schools and schools of public health. It has also influenced the professional organizations that represent them, in particular, the Association of Teachers of Preventive Medicine (ATPM). In 1970, that association began to reorganize its programs so as to better address certain policy issues and to help provide leadership for certain professional aspects of this generally amorphous social movement. Therefore, in June 1971, the Executive Committee of the association began to draft guidelines to assist the development of departments in medical schools in the United States. What was envisioned originally was a "loose-leaf notebook" of the "state of the art" which would also be of use to those responsible for the planning, development, and management of such departments in both new and established medical schools. The initial guidelines were not based upon substantial new data nor did they represent a systematic sampling of opinion from experts in the field. To a degree, they represented a synthesis of periodic reports that reflect the evolution of thinking in the field (*1–7*). Among the most important issues identified was that of residency training which was judged to be of such high priority that a workshop conference was organized and convened at the Asilomar Conference Grounds February 12–13, 1972. In all, 60 faculty and other health professionals attended (see Participants, p. ix).

Although this conference was convened prior to the association between the ATPM and the Fogarty International Center of the National Institutes of Health, it was judged, in retrospect, that the report of this conference should be published along with reports of other conferences supported by the Fogarty Center.

FORM OF THE CONFERENCE

The conference convened on the evening of Saturday, February 12, with a keynote talk by Kurt W. Deuschle, M.D., Lavanburg Professor and Chairman of the Department of Community Medicine at Mount Sinai School of Medicine. His presentation was based upon data which he and Dr. Alfred Miller had summarized in a paper entitled "Objectives of Graduate (Residency) Training in Community, Preventive, and Social Medicine." On the following morning, the conferees participated in small workshop groups, each considering one or another aspect of residency training.

HISTORY AND GROWTH OF RESIDENCY PROGRAMS IN GENERAL PREVENTIVE MEDICINE AND PUBLIC HEALTH

The origins of residency training in preventive and community medicine are well summarized in the following excerpt from the Winter 1961 issue of the *Newsletter of the Association of Teachers of Preventive Medicine:*

> *In 1949 an American Board of Preventive Medicine and Public Health was established to certify properly qualified scientists in public*

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[1] Held at Asilomar, California, February 12–13, 1972.

health. In 1952 the name was shortened to the American Board of Preventive Medicine in order to place the affiliated specialties of aviation medicine and occupational medicine under a parent board. The effect of adding these specialty sections was to make public health a section and in time this became more and more the equivalent of public health practice. A coincidental problem was that all boards must require residency training and the date beyond which all public health candidates must have had residency training had been set at July 1, 1959. Further, the residencies available in public health were inevitably developed around official departments of public health.

This situation did not meet the needs of many persons involved in teaching careers in preventive medicine, in research, in biology, in maternal and child health, in epidemiology, in administrative medicine, and in other special fields of preventive medicine. Accordingly, the Board moved to find ways of establishing eligibility for broader certification and decided upon certification in general preventive medicine or preventive medicine without designation of specialty. Dr. Rodney Beard was chairman of the ad hoc *committee that studied eligibility requirements and recommended the board outlines of certification under the Board together with the essentials of residency programs in preventive medicine without designation of a specialty field.*

Residency programs in general preventive medicine had their origin in 1960–61. Two programs were approved during that year. Over the next 5 years, the number had grown to only eight approved programs offering a total of 55 positions, of which 38 (70 percent) were filled. The following year there was a "growth spurt" to 14, and by 1970–71 the number of approved programs had grown to 23 offering a total of 248 positions although only 103 (42 percent) were filled.

By contrast, when general preventive medicine residencies were first approved in 1960–61, there were 22 approved residency programs in public health offering a total of 104 positions of which 63 (60 percent) were filled. However, over the next 10 years, this number fluctuated so that by 1970–71 a net increase of only seven programs took place. These offered 122 positions, of which 58 (52 percent) were filled.

In general, most residencies in general preventive medicine aim to train individuals for academic careers in medical school and schools of public health. By contrast, the primary purpose of residencies in public health is to provide staff for state and local health departments. Both programs also contribute to the pool of physician administrators in the Department of Health, Education, and Welfare and other federal health agencies.

In November 1967, the National Advisory Commission on Health Manpower was able to identify 4,933 physicians listing themselves as specialists in preventive medicine. However, of this number, most (1,714) listed their primary focus as occupational medicine; 1,619 identified themselves as engaged in public health; and 941 were listed in general preventive medicine. The remainder (659) listed their specialty as aerospace medicine.

Of the 941 listing themselves in general preventive medicine, 358 (38 percent) were employed in health departments and 204 (22 percent) were employed by either the U.S. Public Health Service, the Armed Forces, the Veterans Administration, or some other federal health agency. Therefore, despite the aim to train physicians for academic careers, only 136 (14 percent) were actually employed by medical schools and another 72 (8 percent) by other education institutions. An additional 96 (10 percent) were employed by industry (including pharmaceutical houses), 55 (6 percent) were full-time in nonfederal hospitals, and the remaining 20 (2 percent) in other roles in the private sector (Appendix A).

THE JOB MARKET

The job market for graduates of residency programs in both general preventive medicine and public health is hard to estimate. One cannot accurately estimate the number of unfilled faculty positions from existing sources of data. However, most established departments have been undergoing expansion, and new departments are in the process of development. These academic needs include the methodologic disciplines (e.g., biostatistics, epidemiology), and the disciplines associated with epidemiology in view of the problems of the system and the likelihood of passage of national health insurance legislation within the next few years.

Similarly, one can anticipate increased needs for personnel at the federal, state, and local levels.

Programs of the federal government are expanding rapidly, and they include increasing regionalization of effort. Quasigovernmental agencies, such as regional health planning organizations, are currently seeking health care managers to help meet their new and challenging responsibilities.

Finally, the development of prepaid group practices, such as Kaiser-Permanente and the Health Insurance Program of Greater New York, has created a demand for such trainees within the private sector. This will increase as a result of passage of Health Maintenance Organization legislation. Continued growth of voluntary health agencies such as the American Cancer Society and the American Heart Association can also be expected to increase the number of jobs in this sector. Therefore, it is reasonable to assume that there is a strong job market. If formal training programs do not respond to this increasing need, these various demanding roles will continue to be filled by individuals trained by experience in the "school of hard knocks" as has happened in the past.

In 1967, of a total of 302,504 practicing physicians in the United States, only 4,933 (1.6 percent) were in the field of preventive medicine and public health, and only 941 (0.3 percent) were listed under general preventive medicine. Clearly, this suggests that the dearth of highly trained medical care managers represents one of the most critical shortages of skilled personnel within the health care system. Admittedly, more definitive data are needed.

Therefore, the conference recommended that a systematic survey be undertaken periodically to determine the number of unfilled positions within academic medicine, government, and the private sector so that the job market can be estimated with more precision.

THE CONTEXT OF RESIDENCY TRAINING

Of the 23 approved residency programs in general preventive medicine in 1971–72, 11 were based in schools of medicine, 9 in schools of public health, 2 were with the military, and 1 was in a health department (Appendix A). The focus in most medical school residency programs has been primarily upon epidemiology, and in only two programs was medical care of health services administration specifically listed. In contrast, five of the nine schools of public health included training and experience in medical care and health services administration while also providing some emphasis in epidemiology. The three remaining programs (two military and one health department) were exclusively epidemiologic in their focus. Therefore, only 7 programs out of 23 specifically focused on either medical care or health services administration.

Although detailed data on public health residency programs were not available to the conference, it is reasonable to assume that the emphasis in such training programs represents a balanced spectrum of the classical disciplines of public health including health services administration.

THE APPLICANT POOL

Since the primary concern of the conference was on the training of a highly sophisticated health care manager, it was also assumed that the applicants would come either from medicine or from management. Therefore, applicants should be sought not only in medical schools and schools of public health but also in schools of business and public administration. Accordingly, it was assumed that other university departments that offer training in operations research, systems analysis, systems engineering, and information sciences would contribute to the training of residents as well as the production of graduate students. Since behavioral science departments are now interacting more regularly with departments of preventive and community medicine, they too should be considered as potential sites for aid in training residents. Finally, undergraduate medical students interested in the discipline should be offered specialized opportunities to decide upon epidemiology and health care as a career choice.

It was also agreed that selected medical students with particular aptitude and specialized motivation should be recruited into programs where an all-elective fourth year permits participation in a formal master's degree program in the school of public health. Finally, it was recognized that certain physicians will want to enter medical practice for a period and subsequently turn to preventive medicine through one of these training programs. However, public health is seen as already too dependent upon such physicians and the recruitment focus should shift to medical students when they make their initial career choice. Moreover, it was recognized that certain American specialty boards permit up to a year of training in a related field, and, clearly, a year of community and preventive medicine would seem to qualify in the case of primary care specialties.

The general feeling prevailed that there may already be too many approved residency programs in general preventive medicine and that the emphasis during the next ten years should be on the consolidation of existing programs including closer cooperation (if not integration) between schools of medicine and schools of public health. In his keynote address, Dr. Deuschle particularly stressed this point. It was generally agreed that it is unwise to have residency training programs in general preventive medicine within operating state or local health departments. However, such departments could well serve as very effective locations for placement in field work during the latter part of residency training, particularly for those residents planning to enter governmental service.

Finally, there was a clear consensus that closer cooperation between clinical medicine and public health is needed and that the ATPM should sponsor a workshop to explore the various means of seeking this.

CURRICULUM

Graduate training should be at least 3 years in duration, although it might be shortened for those already trained in a related discipline. It is possible that some time might be saved by formally integrating such residencies with preparatory training programs (i.e., combined M.D.—residency training) although the trend is currently in the opposite direction. There was also agreement that the first residency year should be more academic than experiential and more basic than applied. In selected, highly organized training programs, conferment of an appropriate master's degree may be justified at the end of the first year. The final 2 years should then focus on project work either in academic or field settings leading to fulfillment of the general preventive medicine requirements of the American Board of Preventive Medicine. In addition, it would then be possible for the trainee to extend his program so as to gain a doctorate either in public health (Dr.PH) or a Ph.D. Thus, several master's and terminal degree programs would be possible. It was also suggested that sharp division between the didactic and practical training be avoided, and that the residents should be engaged in some field or project experience during the first year. Formal seminars, other project work, and other structured teaching could continue throughout the second and third years of field study as well.

Some consensus evolved regarding a curriculum containing three tracks, each pointing toward one of the principal job markets. The first track would be academic and aimed at attracting those interested in working in epidemiology or in health services research within medical schools or schools of public health. The second track would be directed toward governmental service and would encourage field work and exchange arrangements between either the Department of Health, Education, and Welfare and its various programs, or state and local health departments and health planning organizations. The final track would prepare residents for the particular problems of the private sector by training sophisticated health care managers for health maintenance organizations, voluntary health agencies, and industrial medical administration.

In summary, within any curriculum proposed, there is the need of enough program structure to give security to applicants and to those providing the resources while retaining sufficient flexibility to meet the wide variety of needs of both the applicant pool and the job market. Evolution toward fewer programs, each with a larger number of trainees, seems desirable. The present emphasis on training in biostatistics and epidemiology should continue as there is urgent need to apply these methods to the design, management, and evaluation of health care systems. Information sciences, operations research, systems engineering, and the social and behavioral sciences will and should find increasing appreciation within health services and administration.

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OBJECTIVES OF GRADUATE (RESIDENCY) TRAINING IN COMMUNITY, PREVENTIVE, AND SOCIAL MEDICINE: THE FIRST TEN YEARS

Kurt W. Deuschle and Alfred Miller

The last 10 years have seen a substantial growth in residency training in general preventive medicine. In the 1961–62 academic year, there were three programs offering 20 positions, of which three (15 percent) were filled. In 1970–71 there were 23 programs offering 248 positions, of which 103 (42 percent) were filled. Based on this trend, Ellingson, on reviewing the progress of the two decades since the founding of the American Board of Preventive Medicine, was able to say three years ago that the "talent gap" of academic teachers and researchers in preventive medicine was well on its way to being closed (Table 1) (*1*).

Yet, a year later Hayman and Cornely, reviewing the status of public health and preventive medicine residencies in the country, concluded: "The nation is now producing one trained specialist for each seven million persons. In ten years, by a major effort, this ratio could be reduced to one for every 3,500,000. In our opinion, there is a rock bottom need for one trained public health administrator for each 250,000, which will never be met by any extension of the present system." (*2*). These widely divergent statements by Ellingson on the one hand and Hayman and Cornely on the other are not really in conflict. In fact, the confusion clears a bit when training objectives are stated explicitly. Dr. Ellingson is concerned with teaching and research; Drs. Hayman and Cornely are referring to service. These goals are, of course, closely related, but it is necessary to clarify the objectives and methods of different types of residency programs. Before we can realistically evaluate the future status of residency training in this country, we must squarely face these divergent goals. We must, therefore, consider public health residencies briefly as a background for understanding the situation in general preventive medicine.

PUBLIC HEALTH RESIDENCIES

Residency training in public health has been and remains centered in departments of health and in the armed forces. In 1968, 14 of the 24 programs had formal affiliations with a school of medicine or public health, but none was operated by a medical school (Table 2). (An exception is the new University of Washington School of Public Health program.) All residencies entail 2 years of field experience; and the completion of board qualification is met by an academic year at a school of public health where an MPH or MS degree is obtained

TABLE 1. Growth of Residencies in General Preventive Medicine[a]

Year	Number of Approved Programs	Number of Positions Offered	Number of Positions Filled	Percentage Filled	Percentage Filled by Foreign Graduates
1960–61	2	—	—	—	—
1961–62	3	20	3	15	—
1962–63	6	31	12	39	—
1963–64	6	47	24	51	0
1964–65	9	55	32	58	13
1965–66	8	55	38	70	10
1966–67	14	106	66	62	11
1967–68	19	154	80	52	10
1968–69	21	206	104	50	9
1969–70[b]					
1970–71	23	248	103	42	10

[a] SOURCE: AMA Council on Medical Education, "Residency Training." *JAMA*, Education Issues, 1960–1971.
[b] No data available from AMA Council on Medical Education for 1969–70.

either before the field experience or between the first and second years. The goal is primarily to train public health administrators and practitioners for carrying out the work of health departments. Residency training in public health got under way very soon after the board was established in 1949, 13 programs being set up almost immediately (*3*). By 1960–61 there were 22 programs offering a total of 104 positions with 63 positions filled. This was an all-time high. Since then, the number of physicians in training has oscillated between 29 (1968) and 60 (1967) with a mean of about 45. However, the number of positions offered rose steadily until 1967, at which point 158 positions were available, and then dropped off sharply to a low of 100 in 1969. In the last 2 years the number of positions offered has begun to rise again (*4*).

This level of enrollment in public health residency programs falls far below the Hayman and Cornely projection required to supply the nation's need for fully trained public health practitioners estimated to be in the order of 1 per 250,000 population (*5*). This underenrollment is compounded even further by the fact that over 65 percent of trainees drop out after the second year, over 50 percent of these in order to enter the armed forces or regular public health employment. (Another 20 percent transfer to other kinds of residency programs.) (*6*). Clearly, most of the demand for public health physicians is met not by residency training, but by physicians who, at most, obtained an MPH. The shortage of this specialized health manpower persists despite the steady increase in the past 10 years with 821 master's degrees in public health or hygiene and 62 doctorates being awarded by schools of public health in 1964, and 1,392 master's and 148 doctorates in 1970 (*7*). Of these, an estimated 25 percent of the 1,392 were physicians. This still does not meet the recommended requirements for trained public health manpower. Drs. Hayman and Cornely may well have a point when they suggest that nonclinical tasks in public health must be taken over by nonmedical administrators.

Yet, even if public health manpower is stretched by the use of nonphysicians, the number of physicians being trained as public health administrators may be seriously inadequate. With only 50 percent of the available residency positions filled, a major problem is recruitment, and here the difficulties are close enough to those of general preventive medicine that it will be helpful to discuss them together. Table 3 presents the total number of physicians who are officially listed as specialists in the preventive medicine-public health field. Of the 4,933 physicians in this AMA category, public health and occupational medicine are almost double in number compared with general preventive medicine. Indeed, of the nation's 302,540 doctors only 2 percent are included in the general field of public health and preventive medicine.

TABLE 2. Growth of Residencies in Public Health[a]

Year	Number of Approved Programs	Number of Positions Offered	Number of Positions Filled	Percentage Filled	Percentage Filled by Foreign Graduates
1960–61	22	104	63	60	—
1961–62	23	119	56	47	—
1962–63	23	135	56	41	—
1963–64	21	117	54	46	0
1964–65	24	106	47	44	0
1965–66	26	138	43	35	4
1966–67	25	158	60	38	—
1967–68	27	118	29	25	3
1968–69	24	100	40	40	35
1969–70[b]					
1970–71	29	122	58	52	6

[a] SOURCE: AMA Council on Medical Education, "Residency Training." *JAMA*, Education Issues, 1960–71.

[b] No data available from AMA Council on Medical Education for 1969–70.

TABLE 3. Distribution of Physicians Listing Themselves as Specialists in Preventive Medicine[a]

Primary Specialty of Medical Activity:	Direct Patient Care				
	Private Practice	Non Private Practice	Active Medical Related	Trainee or Fellow	Total
General Preventive Medicine	0	662	278	1	941
Public Health	0	1,256	361	2	1,619
Occupational Medicine	388	1,175	150	1	1,714
Aerospace Medicine	45	454	160	0	659
					4,933

	Full-time Specialty Practice	Residents	Other Full-time Staff in Hospital	Full-time Faculty	Administration	Research	Total
GPM	408	38	144	171	140	40	941
PH	1,011	33	157	114	248	56	1,619
OM	1,433	16	93	39	102	31	1,714
AM	75	79	346	6	93	60	659
							4,933

	Self Employed	Institution Research	Clinic	Medical School	Other Educational Institutions	Armed Forces	USPHS	H.D.	V.A.	Non Federal Hospital	Industrial and Pharmaceutical	Other Federal Agencies
GPM	1	11	8	136	72	68	84	358	19	55	96	33
PH	0	10	4	93	72	18	191	1,110	8	59	26	28
OM	352	11	45	33	12	47	4	58	10	27	1,013	65
AM	43	9	2	9	2	491	3	3	4	20	47	26

[a] SOURCE: Report of National Advisory Commission on Health Manpower, November, 1967. (As of this report there were a total of 302,540 physicians listed in the U.S.)

PREVENTIVE MEDICINE AND COMMUNITY MEDICINE RESIDENCIES

The subspecialty board in general preventive medicine was established in 1960 to assure the training of academic and research specialists in the field of preventive medicine. The residency programs that have grown out of this mandate reflect this goal with 20 out of the 23 programs located in schools of medicine or public health. (Two are with the armed forces and one with the New York State Department of Health.) There are greater differences in the way the academic training mandate is interpreted than is the case with the service mandate in the public health residencies. All academic programs consider their goal to be a mixture of preparation for service work (in a health department or medical administration) and academic posts (involving teaching and research). Moreover, the area in which the field experience is carried out varies considerably.

In correspondence with the American Board of Preventive Medicine (January 11, 1972), each of a haphazard sample of 40 persons recently declared eligible for the certifying examination in general preventive medicine had had an MPH or academic year. However, the other portion of their training was quite varied: about 50 percent had the straight 2-year residency programs in GPM (General Preventive Medicine); 25 percent had 1 year of GPM with substitution of other clinical training or practice; and 25 percent had the academic year but no formal GPM residency. In this latter category, they substituted either 5 years of suitable practice or a clinical year with 3 years of practice.

Another interesting piece of information from the American College of Preventive Medicine is the membership distribution by specialty board certification (Table 4). Only 5 percent of the total membership have been identified as in general preventive medicine. In part this reflects the more recent origin of GPM as a specialty area and the age structure of the membership of the College.

Table 5 lists the areas of training emphasis by residency programs. Of the 23 programs, 19 list epidemiology as an area of emphasis; 7 list community medicine or health; 7 list health service or medical care administration; 6 list general or clinical preventive medicine; 4 each list environmental health, maternal health, child health, and international health; 2 list population dynamics; and 1 lists nutrition. All of the schools of public health and most schools of medicine (as well as the military and the New York State Department of Health) view extensive research training in epidemiology as one of their goals. Community medicine and clinical preventive medicine are found mostly in schools of medicine, whereas health services administration is emphasized primarily in schools of public health.

TABLE 4. Membership Distribution by Specialty Board Certification: American College of Preventive Medicine 1971[a]

Specialty	Number	%
Public Health (PH)	710	48.6
Aerospace Medicine (AM)	343	23.5
Occupational Medicine (OM)	275	18.8
General Preventive Medicine (GPM)	78	5.3
Dual ACPM certification	26	1.8
Certification by other specialty boards	30	2.0
Total Fellowship	1,462	100.0%

[a] SOURCE: American College of Preventive Medicine 1971: (Ward Bentley).

We should also consider briefly two other kinds of programs now in existence since they can also lead to board qualification in general preventive medicine. One, the clinical scholar program, has been run for several years now at such medical schools as Johns Hopkins, Duke, McGill, Stanford, and Western Reserve. This is an academic program usually mounted on a standard internal medicine or pediatric residency. For 9 months, residents are freed of their regular clinical duties and attend classes in an MPH program or its equivalent. During this time, they can also continue to keep close touch with their medical colleagues by attending rounds, case conferences, etc. Generally the academic work emphasizes health care research and prepares the candidate for a fourth-year project which involves both clinical and health care organizational research. The objective is to qualify the candidate for his boards in both a clinical specialty and general preventive medicine, leading to an academic career in health care research or clinical epidemiology.

The second program, the social medicine residency at Montefiore Hospital in New York City, is

TABLE 5. Areas of Training Emphasis by Residency Programs in General Preventive Medicine[a]

	School of Medicine (11)	School of Public Health (9)	Military (2)	N.Y.S. Health Department (1)	Total (23)
Epidemiology	7	9	2	1	
Community Medicine or Health	6	1			7
Medical Care or Health Services Administration	2	5			7
Clinical or General Preventive Medicine	4	2			6
Environmental Medicine or Health	2	2			4
Maternal Child Health		4			4
International Health		4			4
Population Dynamics		2			2
Nutrition		1			1
Military Preventive Medicine					2

[a] SOURCE: Directory of Approved Internships and Residencies, 1971–72.

an internal medicine (or pediatrics) residency program emphasizing ambulatory care and the team approach to health care delivery in the setting of an OEO (Office of Equal Opportunity) health center, where social problems often require as much attention as the strictly medical problems. This is accompanied by seminars in epidemiology, behavioral sciences, environmental health, and administration and by interdisciplinary family care conferences. The resident has the option of attending a school of public health for 9 months to secure an MPH and, by staying an extra year, can be board qualified in preventive medicine as well as in his clinical specialty.

Unlike the essentially stable situation in public health residencies during the past 10 years, residency programs in general preventive medicine have grown rapidly since 1960 when the subspecialty board was established. Two programs were started immediately; today there are 23 active programs. The number of positions offered has grown from 0 in 1961 to 248 in 1971 (*8*). The number of positions filled, i.e., the number of physicians in training, also grew rapidly until 1968, but has remained stable at just about 100 since then. This, together with the gradual decrease in the percentage of positions filled since 1966, makes one wonder if we are not already seeing the same kind of initial saturation effect that occurred in public health residencies about 10 years after creation of the subspecialty board in public health.

THE CAREER OUTCOMES FOR GRADUATES OF PREVENTIVE AND COMMUNITY MEDICINE RESIDENCIES

The most obvious role to train residents for, and the one closest to the hearts of all program directors, is the academic role involving teaching and research in a department of preventive or community medicine or in a school of public health. In the past, research and teaching have focused on epidemiology, clinical preventive medicine, or environmental health. More and more, however, with government and community pressure for better health care delivery, research and teaching in the area of health care organization and delivery can be anticipated. However, as we will see below, the number of graduates who can be absorbed into academic departments is limited, and to be realistic, our residency programs also must prepare graduates for playing service roles in the health care system.

Judging by the present distribution of specialists in preventive medicine, the vast majority of graduates will find positions in health departments, the United States Public Health Service (and armed forces), and other government agencies, as well as industry. Given the increasing complexity and cost of medical care and the demand to "rationalize" the health care industry through better organization of practice, such as HMO's (Health Maintenance Organizations) (prepaid group practice), an obvious role for the preventive medicine graduate will be that of medical director of practicing groups or ambulatory care clinics, especially where the programs are closely tied to clinical residencies or function as a joint field training project. This role will require a person with good understanding of clinical problems plus training in administration and health care evaluation, epidemiology, and behavioral science.

Another important role arises from the continuing need for public health physicians in local and state health departments. This requires training in epidemiology, public health practice, administration, and environmental health. As a consequence of federal health legislation, there is bound to be a growing need for health planners, a role that will require training in administration with a heavy emphasis on system analysis, evaluation, and medical care research as well as economic, political, and behavioral science. Roles in the United States Public Health Service, armed forces, and other government agencies will require some mix of the epidemiological, public health practice, environmental health, and administrative and planning skills considered above.

The question naturally arises whether it is possible to train any resident in all the skills which may be called for in the various roles in which he may some day find himself. Obviously not; and, unlike clinical subspecialization, it is less likely that the resident will be able to pick out the exact area of concentration early in training and narrow his interest to that field. To some extent, he can, but for the most part it will be necessary to structure the training in a broad enough way that he can move on his own with enough depth in a subject of interest so that he learns the *process* of independently grappling with a problem, organizing it, doing the research, planning to solve it, and evaluating the results.

MARKET FOR GRADUATES IN GENERAL PREVENTIVE MEDICINE

It is difficult to estimate the "market" for graduates of residency programs in general preventive medicine because the rate at which schools of medicine and public health will be able to absorb them depends so much on the amount of federal and foundation money forthcoming for research and teaching. Assuming increasing concern for better planning, administration, and evaluation of the health care system will bring with it increasing research budgets for preventive medicine, we can make at least an order of magnitude guess about the demand for trained graduates in the coming decade.

The United States Public Health Service recommends a minimum of six full-time faculty members for a department of preventive medicine of any medical school with a class of 96 or more (*9*). The Saratoga Springs Conference of the ATPM (Association of Teachers of Preventive Medicine) in 1963 recommended a minimum of two faculty members in each of 4 to 5 core areas in any "research departments" (and we would anticipate that all academic departments would aim to be research departments) (*10*). Thus, we might compromise at eight as a minimum faculty size and hope for ten as an average since the number of large departments will be included in the average. The "Project on Teaching of Preventive Medicine" of the Institute for the Advancement of Medical Communication in 1963 found the average size department of preventive medicine included 4.8 members, 52 percent having five or less (*11*). The National Advisory Commission on Health Manpower in 1967 found 136 physicians employed full time in medical schools or about 1.4 for each school, meaning that about one preventive medicine faculty member out of four is a physician (*12*). If we assume that the percentage of physicians in preventive medicine departments ought to increase to 40 percent as the emphasis changes to health care research, this would mean a need for about 2.5 preventive medicine physicians per department plus another 0.5 for those retiring in the next 10 years or about 300 for the nation. This would be 30 graduates per year for the next 10 years or just about the rate at which we are presently producing them. This figure almost seems to indicate a kind of clairvoyance among the applicants whose number has leveled off at that rate for the past 3 years.

However, this figure is obviously much too incomplete and needs a number of revisions both upward and downward. Even though we like to think of a residency program as aimed primarily at producing new teachers and research people for departments of preventive and community medicine, in fact only a small percent of diplomates will probably end up in such departments. The same Commission report in 1967 showed only one preventive medicine specialist in seven located in a medical school. Many more were working in health departments, the United States Public Health Service, schools of public health, industry, and the armed forces. Assuming these areas will require replacement and, hopefully, a fair amount of expansion, the number of trained general preventive medicine graduates needed in the next 10 years would be 4 to 5 times the 300 estimated above when judged on the basis of medical school needs alone.

On the other hand, the main source of preventive medicine specialists in the past has been from physicians who have trained as clinicians and then, for one reason or another, switched to the field of preventive medicine. This may continue to be a major route by which physicians enter our specialty, and probably this is a good thing. However, this again reduces our estimate of the number of trained preventive medicine physicians who can be absorbed out of residency programs, let us say by about two-thirds, i.e., to about 450 in the next 10 years or about one to one and one-half times as fast as they are now being turned out. These estimates would be even more striking if the needs of schools of public health were inserted into the total manpower requirements.

The final factor to be taken into account is the possibility that as board certification becomes a more important criterion for employment, and as health care research becomes a more central component of service as well as academic work, health department (public health) residencies may merge with or move to cooperate with academic programs, thereby making the medical school a more important resource for the training of public health personnel in the service sector itself. This last possibility is very difficult to quantify, even as a guess. But it is probably safe to assume that we could increase the number of trainees between 50 to

TABLE 6. Residency Traineeship Grants—USPHS FY 1971

State Congressional District	Grantee Institution	Type of Program	Trainees	Approved Budget	Balance From FY 1970	Amount of Award
Alabama						
(6)	Jefferson County Dept. of Health	DPH	2	$ 17,776	$ 13,008	$ 4,768
(6)	Univ. of Albama	GPM	1	9,050	—	9,050
California						
(7)	California Dept. of Public Health	PM/PH	7	49,620	29,570	20,050
(7)	Univ. of California Berkeley	GPM	3	29,809	4,991	24,818
(28)	Univ. of California Los Angeles	GPM	3	24,443	—	24,443
Colorado						
(1)	Colorado Dept. of Public Health	DPH	2	18,000	—	18,000
Georgia						
(5)	Georgia Dept. of Public Health	DPH	2	18,400	15,620	2,780
Illinois						
(20)	Illinois Dept. of Public Health	DPH	2	19,652	7,620	12,032
Kentucky						
(6)	Kentucky Dept. of Health	DPH	1	7,700	7,700	0
(6)	Univ. of Kentucky	GPM	3	21,144	1,769	19,375
Louisiana						
(2)	Tulane	GPM	3	32,043	8,295	23,748
Maryland						
(3)	Univ. of Maryland	GPM	1	10,150	0	10,150
(3)	Johns Hopkins Univ.	GPM	11	127,875	13,372	114,503
(4)	Maryland State Dept. of Health	PM/PH	3	30,299	427	29,872
Massachusetts						
(9)	Harvard School of Public Health	GPM	3	28,517	19,049	9,468
(9)	Harvard School of Public Health	GPM	2	21,820	6,187	15,633
(9)	Harvard School of Dental Medicine	DPH	1	12,320	0	12,320
(9)	Harvard School of Dental Medicine	DPH	4	40,120	0	40,120
Michigan						
(2)	Univ. of Michigan School of Public Health	DPH	2	24,780	2,408	22,372
Minnesota						
(5)	Minnesota Department of Health	PM/PH	1	7,000	893	6,107
(5)	Minnesota Department of Health	DPH	1	7,500	0	7,500
New York						
(19)	New York City Dept. of Health	PM/PH	2	19,284	0	19,284
(29)	New York State Dept. of Health	DPH	2	15,162	10,076	5,086
North Carolina						
(4)	No. Carolina State Board of Health	DPH	1	9,617	471	9,146
(4)	Univ. of North Carolina	GPM	2	21,208	5,687	15,521
(4)	No. Carolina State Board of Health	PM/PH	2	19,614	0	19,614
Ohio						
(15)	Ohio State Univ.	GPM	3	24,500	0	24,500
Oklahoma						
(5)	Univ. of Oklahoma	GPM	3	27,933	2,326	25,607
Oregon						
(3)	Oregon State Board of Health	PM/PH	3	24,500	16,456	8,044
Pennsylvania						
(3)	Jefferson Medical College	GPM	2	18,600	8,986	9,614
(17)	Pennsylvania Dept. of Health	PM/PH	4	33,502	22,502	11,000
(3)	Philadelphia Dept. of Public Health	DPH	2	18,760	3,394	15,366
Tennessee						
(5)	Tennessee Dept. of Public Health	PM/PH	2	15,500	2,126	13,374

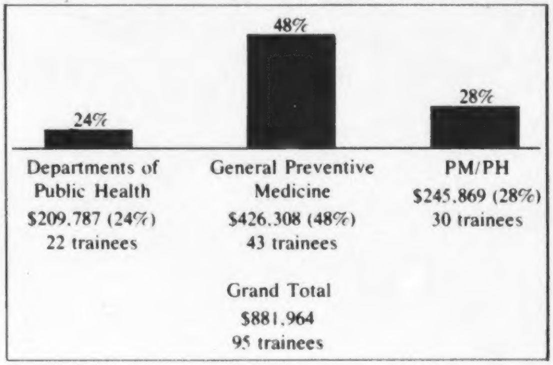
TABLE 6—continued

State Congressional District	Grantee Institution	Type of Program	Trainees	Approved Budget	Balance From FY 1970	Amount of Award
Utah						
(2)	Utah State Division of Health	PM/PH	2	10.617	10.617	0
Virginia						
(3)	Virginia State Dept. of Health	PM/PH	1	9,200	208	8,992
Washington						
(3)	Washington State Health Department	PM/PH	3	26,733	4,000	22,733
(3)	Univ. of Washington	GPM	3	29.216	0	29.216
	37 grants for total of		95	$881.964	$217.758	$664,206

100 percent without the danger of producing a glut on the market. All this, of course, is contingent upon adequate financing—something much more problematic in preventive medicine than in clinical medicine, since the service produced is a public rather than a private good, one that is paid for in the final analysis through tax levies, a process subject to the vagaries of the political process.

In the immediate future at least, it seems more likely that the major problem will be to find recruits for residency programs, rather than to find positions for graduates. The second major problem is to secure adequate financing of the program. The entire federal support for preventive medicine-public health residencies in 1972 came to only $880,000 apportioned for 95 trainees, an average of $9,300 per trainee including tuition and travel. (The breakdown by program type is shown in Tables 6 and 7.) In 1975 there are 35 students receiving $345,883, an average of $9,900. This clearly comes nowhere near providing the number of traineeships to supply the national need; nor are the stipends high enough to compete with growing clinical residency salaries, subsidized as they are by third party reimbursement schemes.

TABLE 7. Federal (USPHS) Support of Residency Training in General Preventive Medicine—Public Health by Program Types



APPENDIX A

Keynote Speech and Workshop Objectives

ASSOCIATION OF TEACHERS OF PREVENTIVE MEDICINE
Asilomar, California

PURPOSE OF THE KEYNOTE TALK
Kurt W. Deuschle, M.D.

1. To define the objectives of the graduate (residency) training in departments of Community, Preventive, and Social Medicine.
2. To review the current status of residency training programs in CP&SM departments including time trends and comparison with M.P.H., Dr.P.H. training in schools of public health.
3. To define the roles for which such training should be directed (e.g., careers in academic medicine, health services administration, health planning, governmental agency administration).
4. To estimate the "market" for such trainees over the next ten years.

WORKSHOP #1
TEACHING MODELS

1. What are the most useful teaching models for residency training in Community, Preventive, and Social Medicine?
2. Are these teaching models the same as those used for undergraduate medical students, and if so, will they be able to bear the burden of both programs?
3. Will new teaching models be needed for a program which plans a new residency program?

Chairman: Dr. C. Hilmon Castle, Dept. Com. Medicine, University of Utah
Recorder: Dr. T. Timothy Crocker, Dept. of Medicine, University of Calif., San Francisco School of Medicine

WORKSHOP #2
INTERRELATIONSHIP OF GRADUATE AND UNDERGRADUATE TRAINING

1. To what extent should residency training in CP&SM be an extension of undergraduate training?
2. Can a closely coordinated undergraduate-graduate program shorten the time of training, and is the M.D. degree a necessary prerequisite for graduate training?
3. What undergraduate courses and curricula are best adapted to graduate training?

Chairman: Dr. Robert Crede, Dept. of Community Medicine, University of Calif., San Francisco Medical Center
Recorder: Dr. Hugh Fulmer, Dept. of Community Medicine, University of Massachusetts Medical School

WORKSHOP #3
ROLE OF THE BASIC SCIENCES IN GRADUATE EDUCATION

1. Should basic sciences such as Social and Behavioral Sciences, Mathematics, and Information Sciences be included as elements of graduate training?
2. How will such involvement affect the graduate training programs in these basic science departments?
3. To what extent should emphasis be placed on combined M.D.-Ph.D. degree training in one or another of these basic science departments?

Chairman: Dr. Herbert Abrams, Department of Medicine, University of Arizona
Recorder: Dr. Joseph Stokes, Department of Community Medicine, University of California, San Diego

WORKSHOP #4
ROLE OF RESEARCH AND TEACHING IN GRADUATE TRAINING

1. To what extent should research experience be included as either a required or elective element of graduate training?
2. Which research projects would be most suitable for such training (e.g., epidemiologic studies, health services research, etc.)?

3. To what extent should residents in CP&SM be involved as teachers of undergraduate medical and other health sciences to students?

Chairman: Dr. John Fox, School of Public Health, University of Washington

Recorder: Dr. Nemat Borhani, Department of Community Health, University of California, Davis School of Medicine

WORKSHOP #5
INTERRELATIONSHIP WITH OTHER RESIDENCY TRAINING PROGRAMS

1. Should departments of Community, Preventive, and Social Medicine assume responsibility for either the direction or coordination of training programs in primary medical care (family practice)?
2. If graduate training programs in both primary medical care (family practice) and in CP&SM exist in the same institution, what should their relationship be?
3. What should be the relationship between residency training in CP&SM and residency programs in medicine, pediatrics, psychiatry, and other clinical departments?

Chairman: Dr. Lester Breslow, Department of Preventive and Social Medicine, University of California, Los Angeles

Recorder: Dr. Robert Huntley, Department of Community Medicine and International Health, Georgetown University, School of Medicine, Washington, D.C.

WORKSHOP #6
FIELD EXPERIENCE AS A TEACHING MODEL

1. To what extent should field experience be an element of the residency training programs in CP&SM?
2. What role should local, state and federal public health agencies play as teaching models?
3. What is the role of other agencies such as Comprehensive Health Planning, Regional Medical Programs, and voluntary health agencies as teaching models?

Chairman: Dr. Count Gibson, Jr., Department of Community and Preventive Medicine, Stanford University School of Medicine

Recorder: Dr. Robert Eelkema, Department of Community Medicine, University of North Dakota

WORKSHOP #7
INTERRELATIONSHIP WITH GRADUATE TRAINING IN SCHOOLS OF PUBLIC HEALTH

1. Should the graduate training programs in departments of CP&SM have different training objectives than those in Schools of Public Health?
2. Should an M.P.H. degree be either an element of or a prerequisite for residency training?
3. What special problems are presented for those institutions with both schools of medicine and public health?

Chairman: Dr. Warren Winkelstein, Division of Epidemiology, University of California, Berkeley

Recorder: Dr. Fred Gilbert, Jr., Department of Community Health, University of Hawaii School of Medicine

WORKSHOP #8
EVALUATION AND ACCREDITATION

1. Is the American Board of Preventive Medicine an adequate accrediting mechanism for graduate training programs in departments of Community, Social, and Preventive Medicine?
2. If so, how might the ABPM be modified to better serve this purpose?
3. Is there need for continuing accreditation of diplomates of the ABPM and, if so, how does such continuing accreditation relate to questions 1 and 2?

Chairman: Dr. Cortlandt Mackenzie, Health Care and Epidemiology, University of British Columbia, Faculty of Medicine

Recorder: J. J. Beeston, Department of Community Medicine and Public Health, University of Southern California School of Medicine

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